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SIX PAPERS OF T.D. CUTSFORTH WERE CHOSEN FOR POSTHUMOUS REPUBLICATION ON THE CRITERION OF RELEVANCE TO CURRENT RESEARCH. THE ARTICLES INCLUDE "THE SYNAESTHESIA OF A BLIND SUBJECT WITH COMPARATIVE DATA FROM AN ASYNAESTHETIC BLIND SUBJECT--CHAPTERS 5 THROUGH 7" (COAUTHORED WITH R.H. WHEELER), "ROLE OF EMOTION IN AN SYNAESTHETIC SUBJECT--SUMMARY AND DISCUSSION," "AN ANALYSIS OF THE RELATIONSHIP BETWEEN TACTUAL AND VISUAL PERCEPTION," "BLINDNESS IS AN ADEQUATE EXPRESSION OF ANXIETY," PERSONALITY AND SOCIAL ADJUSTMENT AMONG THE BLIND," AND "ARE WE TRULY PART OF THE COMMUNITY." REFERENCE LISTS, DIAGRAMS OF EXPERIMENTAL APPARATUS, AND TABLES ARE PROVIDED FOR THE SIX PAPERS. ALSO CITED ARE 22 WORKS BY CUTSFORTH. THIS DOCUMENT IS AVAILABLE FROM THE AMERICAN FOUNDATION FOR THE BLIND, 15 WEST 16TH STREET, NEW YORK, NEW YORK 10011. (CF)

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PREFATORY NOTE

Although the papers which comprise this issue of the Research Bulletin could be construed as a memorial volume honoring a vigorous researcher, the reader would be mistaken in the inference. Such a project was considered some time ago. Dr. Thomas Cutsforth's wife, however, Dr. Margery Cutsforth, was very insistent on the point that her husband would wish only publication of those of his papers which the research community would find of interest and value at the present time.

In compliance with their wishes, then, the following papers underscore some still-unresolved issues in research on blindness. Although any selection of papers must be by nature deficient in one or another respect, our task was rendered very easy because, while his publications span the enormous range of 40 years, there is little in that output which is not of direct relevance to current research interests. His interests ranged from detailed studies of synaesthesia, though the social and emotional adjustment of blinded persons, to the study of attitudinal variables operating in the interaction of the blind and sighted communities. We have tried only to present a sampling of these interests, in the hope that the reader will be tempted by their excellence to return to the original sources.

He will find his labor transforming itself into pleasure at the lively and literate style which always characterized Dr. Cutsforth's writing. He will be no less stimulated by the vigor and clarity of Dr. Cutsforth's thought, by turns inspiring and downright controversial, and, as a further guide to the reader, we have appended a bibliography which we believe to be complete.

Thomas D. Cutsforth was born in Wisconsin in 1893. His family moved to Oregon in 1900. Four years later he was blinded, and he attended the Oregon School for the Blind from 1905 to 1912. He earned his B.A. and M.A. degrees in 1918 and 1923, at the University of Oregon, and his Ph.D. in 1930 at the University of Kansas. He was a research fellow of the Social Science Research Council in Boston; a research professor under a Carnegie Foundation grant at the University of Kansas; and received his diploma in clinical psychology from the American Board of Examiners in Professional Psychology in 1949. From 1936 to 1959 Dr. Cutsforth practiced clinical psychology in Los Angeles. He died on 30 November 1962 in Los Angeles.

All of Dr. Cutsforth's studies were meant to be provocative. In reproducing them for the research community, we fully expect these studies to provoke fresh thought and discussion once again.

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THE SYNAESTHESIA OF A BLIND SUBJECT WITH COMPARATIVE DATA FROM AN ASYNAESTHETIC BLIND SUBJECT: CHAPTERS V THROUGH VIII*

A THEORY OF SYNAESTHESIA

The whole problem of synaesthesia needs working over in the light of more detailed and exhaustive laboratory experimentation. Too often has it been regarded an anomaly which aroused interest only from the point of view of curiosity. We have pointed out that introspective descriptions of such phenomena have been lacking in the literature; that no investigator has demonstrated that synaesthesis is confined, in any one case, to the field of perception; and that only a very small percentage of contributions to the problem have mentioned the existence of extraperceptual forms. Moreover, it is more or less remarkable that so few investigators have observed the apparent connection between synaesthesis and the general problem of meaning.

From a detailed study of only one case it will be impossible for us to derive conclusions which claim general validity. Neither will it be possible to confirm or destructively criticize much of the work which has already been done on synaesthesia. Our results have been obtained and have been interpreted solely from the point of view of the value or function of synaesthetic processes in the consciousness of our subject who possesses it. Nevertheless we feel justified in discussing certain alleged facts and certain theories which have appeared in the literature inasmuch as one case, thoroughly studied, ought certainly to prove suggestive.

As early as 1864 Chabalier (3) very nearly reached the core of the functional problem when he noted that letters were meaningless without their colored associates. One of the Nussbaumer cases of 1873 (8) throws some light upon the problem. It was noticed that isolated tones were always colored for the same individual, while musical concerts were not. This fact points to a cognitive theory of synaesthesis rather than to a physiological theory as such. For if synaesthesis is due to changes in blood supply in the brain - to the physiological disturbances underlying emotional states of mind - one would certainly expect that if colors were to appear in the one situation (isolated tones) and not in the other (listening to a concert) the concert would produce the colors. Any physiological view such as that of anastomosis of fibers or a lack

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* This monograph was written in conjunction with R. H. Wheeler.

of differentiation of function in adjacent brain areas would lead to an inevitable "seeing" of colors when tones were heard. If such theories were true one would hardly expect that in the same individual synaesthetic processes would appear one moment and not the next. But if synaesthesis is a cognitive process and purely functional in nature, rather than a phenomenon based upon structural-organic brain conditions, i.e., if it is definitely a problem of meaning, then we can understand how a person could experience colored tones without colored concerts. Combinations of tones, sucessions of tones and harmony possess different meanings from isolated tones. Thus while perceptions of isolated tones might, in a certain individual, require synaesthetic imagery, the understanding of a concert - an entirely different cognitive process - might not of necessity involve colored hearing. In a succession of tones a subsequent tone may interpret its antecedent while an isolated tone has no such subsequent tone upon which its meaning can be based.

In 1887 Steinbrugge (9) hinted at the evident nature of synaesthesis when he suggested that it was a "double-perception," or a primary perception accompanied by a "sub-perception." But he concluded that the visual synaesthetic image appeared too rapidly upon the sound stimulus to allow for the forming of an association between a sound and a visual image. Therefore he resorted to a purely physiological theory. In 1913 Bleuler (2) critized the association theories of synaesthesis on the ground that colors may be connected with sounds in colored hearing as early in childhood as to precede the development of meaning. While no one knows exactly when meaning develops in the life of a child the assumption does not seem wild that imagery and meaning develop hand in hand. We know that synaesthesia has come to function as meaning in the mental life of our reagent; we know that it functioned as meaning as far back as he can remember. As long as synaesthesis persists we should expect it to function as a process of meaning; when synaesthesis disappears as it is said to do in certain cases, the particular meaning constituted by the synaesthetic process has likewise disappeared. Meanings are absolute whether they be specific or general. Meanings disappear with process-functions; new process-functions provide new but perhaps similar meanings.

The observed permanence of synaesthesis (see 4, 5, and 11) points to permanence of meaning. For example a certain child might come to have a visual image of blue with the letter "*e*"; as long as this synaesthetic image persisted in the individual's mental life this same blue would always mean "*e*"; but if the blue should disappear in connection with the "*e*," some other processes would take the place of the visual synaesthetic image such as auditory, vocal-motor or some other, and asynaesthetic visual image.

The stereotyped nature of the synaesthetic image offers no particular difficulty when interpreted as a meaning-phenomenon.

Meanings are always stereotyped. This absolute nature of meaning provides validity to knowledge itself. But it is the manner of functioning of mental contents, rather than specific mental structures as such, which gives to meaning its absolute character. Thus if synaesthesis is a meaning-function we should here expect to find stereotyped meaning as well as structure and this is what we actually do find. The important issue, then, is not concerned with the fixed structure of the synaesthetic image but it is concerned with the manner in which one particular image rather than another happened to develop as the partner to the primary process in the growth of meaning. The problem in colored hearing is then: Why does a certain blue or yellow rather than an auditory or a vocal-motor image come to identify the sound of a tuning fork; or why does the shift of attention from nonfocal auditory qualities to a visualized color function as meaning rather than a shift from auditory qualities to other visual or to vocal-motor tendencies? In either case the shift of attention - the functional aspect - is the stereotyped factor and the problem lies in explaining why one subsequent process rather than another came to be selected as the identifier of the tuning fork sound.

Hence our notion as to a plausible theory of synaesthesis has changed as a result of our present investigation. We do not argue that meaning is a cause of synaesthesis or that synaesthesis is a cause of meaning; nor will we admit that the two are accompaniments of one another for reasons which we will discuss later. We hold that synaesthesis *is* meaning; that it is a process of meaning. Thus we can no longer accept a theory of anastomosis or of entanglement of fibers for the reason, first, that such a brain condition would lead to a permanency of synaesthesis. Some forms of synaesthesis are not permanent. If fibers became entangled or anastomosed during growth we should expect them to always remain in that condition. Secondly, this view can hardly describe the situation with respect to synaesthetic phenomena in the higher intellectual processes where every other modality is paired with a visual image, and where association is reversible. Neither would it explain how colored tones can exist without colored concerts. Thirdly, it presumes that synaesthesis is only a perceptual process, taking place with peripheral stimulation. And such, we have found, is not the case.

Furthermore we have been obliged to discard lack of differentiation of function as a possible theory. If brain areas are lacking in differentiation of function, thus causing a confusion between audition and vision, or causing a dual response from a single stimulus, we would have to conclude that in certain cases every localized sensory area *except* the visual lacked differentiation - a highly improbable state of affairs. Moreover, this view would lead every isolated tone and combination of tones to appear colored in colored hearing. This is not always the case. Again, since every attribute of a sound sensation or an auditory image, in our subject at least, has its concomitant in an attribute of

the visual associate and determines this corresponding attribute in the visual associate, there must be as great a differentiation of function in the auditory as in the visual center of the brain, otherwise these detailed causal relations between the auditory and the visual processes could not exist. The auditory area, lacking differentiation, could not operate in causing differentiated functions in the visual area. And finally, neither of the two views just mentioned gives us any clue as to how a dissociated or detached visual synaesthetic image comes to stand for or mean an auditory process. In fact all of the physiological theories which have so far been advanced fail to take into consideration the cognitive functions of synaesthesis.

The facts which have been construed as pointing to a physiological theory are as follows:

1) the simultaneity of primary and secondary process in synaesthesis;

2) the close proximity of brain areas involved in synaesthesis;

3) the stimulating influence of drugs;

4) the irreversibility of (perceptual) synaesthesis;

5) the influence of fatigue;

6) the disappearance of synaesthesis during adolescence;

7) the dependence of secondary attributes upon primary attributes;

8) the early appearance of synaesthesis in childhood;

9) the suddenness and spontaneity with which any single instance of synaesthetic association arises.

These arguments are either misleading, or, as we have already pointed out, their truth is open to very serious question. Rather than pointing to a physiological theory, these arguments all point to the cognitive nature and functioning of synaesthesis and to theories of reflex mechanisms. They do not necessarily point to organic conditions.

Meaning involves simultaneous groupings of contents and process-functions. The brain areas involved in synaesthesis may be as far apart as brain anatomy will allow. Meanings are influenced, just as synaesthesis is influenced, by drugs. Meanings change during adolescence. Meanings are determined by attributes of sensory experience and so are synaesthetic images. Meanings ob-

viously develop with the growth of imagery in childhood. Meanings develop "suddenly and spontaneously" in the same fashion as does synaesthesis. Who has not tried to comprehend the meaning of something and has not found that meaning "dawning" upon him suddenly and with evident spontaneity?

The "meaning" interpretation of synaesthesis allows for perfect harmony between the facts which were alleged to have supported a physiological view and the facts which have been advanced in support of an association theory. (See 11, page 38, for arguments in favor of an association theory.) Otherwise we cannot harmonize the two sets of facts without positing two radically different species of synaesthesis, an assumption entirely unwarranted by the facts. If one reviews the facts concerning synaesthesis he finds everything in favor of the phenomenon as a meaning-function and nothing against it. Such facts in part are: the variability in localization of the secondary process; the intensifying effect of emotional experiences; the fact that no two people have the same association in synaesthesis except as a matter of coincidence; the fact that in some cases visual perceptions arouse synaesthetic visual imagery, and the like. In addition to these facts we are confronted by the following results from this investigation:

1) meaning is lacking in the absence of the synaesthetic image;

2) the synaesthetic image invariably identifies the primary process in every particular and in general as well;

3) wherever several primary processes have the same meaning they are identified by the same, single secondary process (for example, a flute tone is yellow, auditory imagery of that flute tone is yellow, the word "flute" suggests the same yellow, etc.);

4) the secondary process functions for familiarity;

5) the synaesthetic image may control the direction of the reagent's trend of thought;

6) the behavior of attention in perceiving and in recognizing is the same in our synaesthetic reagent as it is in the check reagent wherever meaning develops;

7) the synaesthetic image functions in an *Aufgabe* consciousness as do other meaingful processes;

8) under conditions which do not allow for the development of meaning, synaesthetic images are meaningless;

9) synaesthetic phenomena function in the development of meaning as marginal or "background" processes of consciousness in the same fashion as does a kinesthetic background in the asynaesthetic reagent;

10) synaesthesis is reversible wherever meaning is reversible and is irreversible where meaning is irreversible;

11) synaesthetic processes function in the foreshortening of meaning contexts.

We believe, therefore, that our past notion of synaesthesis must be changed. We must resort to explanations which will do justice to these facts as the most important features of the phenomenon in question. And to do this we must resort to functional reflex mechanisms rather than to organic brain conditions.

The first hint as to a possible reflex theory of synaesthesis may be found in the fact that synaesthesis is not an absolute simultaneous process as it is so often thought to be. Simultaneity comes about after both processes have appeared, in that they persist together, but in their behavior is to be found evidence that a stimulus-response function is operating. The primary process may function either as a stimulus or as a response, usually the former. The secondary process may have both functions under different conditions but usually the function of response, unless it is detached. In all instances the function of the given process depends upon the situation in which it takes place. In case of perceptual synaesthesis the primary process is usually the stimulus and the visual associate is the response. In imaginal synaesthesis the stimulus function of the visual image depends upon the mental activity which has preceded and upon the nature of the implied or explicit *Aufgabe* at the time. In all instances synaesthesis involves a shifting of attention a) from primary to secondary process; b) a momentary shift from secondary to primary and back to secondary again; or c) repeated shifts from one half of the complex to the other, always ending with the visual associate. In no instance are both the secondary and the primary processes attended to focally; the primary process always seems to be a "step behind" attention. In other words, everywhere in the synaesthesis of our subject we found a stereotyped behavior of attention, namely, an inevitable tendency to shift away from primary process to secondary process, the only exceptions being a momentary shift in the reverse direction when the secondary process functioned as a stimulus. Such a stereotyped behavior of attention suggests that in essence the process is a reflex phenomenon. And because of the fact that the associated contents in synaesthesis do not appear associated in like fashion in asynaesthetic individuals we have called this reflex phenomenon a form of conditioned reflex. The inevitable shift or determination of attention toward visual qualities and away from nonvisual qualities suggests

that a mechanism of irradiation is at bottom responsible. Once a visual synaesthetic image has become detached from its parent process we have the phenomenon of disintegration or dissociation. When this dissociated image appears alone in consciousness but is clarified or rendered more stable by the advent of the primary process we have the phenomenon of facilitation. Stimulus and response functions are interchangeable. A certain muscular contraction in walking for example is at once a response to an antecedent contraction and a stimulus for a subsequent contraction. The visual synaesthetic image may likewise function in either respect. We are unable, however, to offer any reason why a certain color rather than another originally came to be associated with a given tone or other nonvisual experience. One would have to know the original circumstances in detail to make such a suggestion. Perhaps one might assume that any given association between sight and sound or sight and touch was due to local functional brain conditions such as differentials in potential energy in different neuron patterns or to synaptic resistance and the like.

We liken synaesthetic processes to conditioned reflexes in that the associations in the former are evidently conditioned. For example a particular shade of blue comes to function as a response to the sound of a tuning fork rather than as a response to a normal stimulus. We persume such a normal stimulus to be the word "blue," an *Aufgabe* process to recall a visual image of blue or the name of some blue object. The conditioned feature of the reflex is its artificial or arbitrary nature. Like the conditioned salivary reflex it is based upon the reflex mechanism of irradiation, presumably; but in synaesthesis we have a widespread tendency toward such irradiation. The visual center in our reagent might be more closely related functionally to the motor projection areas than in normal reagents. Hence any stimulus tending to produce a response leads toward the motor projection areas by way of the visual area.

If such a hypothesis is true it would mean that in observer *A* the physiological processes subserving conscious activities would be somewhat as follows. Assuming at the outset that motor projection areas are quite as important for consciousness as are the so-called "sensory" areas, nerve impulses in *A*'s case are drained from the various sensory areas toward the motor projection areas through the visual area. The latter evidently possess a closer functional relation with the motor projection areas than do the other sensory regions. While this view may apparently assume the brain regions account for sensory specificity, there seems to be no reason why such an implication is not safe. Thus a tone is "seen" and not "heard" as far as meaning is concerned because, in the arousal of a definitized conscious process, the visual area functions as the region of integration rather than the auditory. But we must assume, however, that since the sound which is "seen" is of auditory origin, the auditory region is as differentiated in

function as is the visual, and, prior to the arousal of the visual concomitants, functions to determine in detail the behavior of the visual contents. The fact that no auditory qualities are "heard" directly does not necessarily mean that the auditory area lacks differentiation. Rather it means that the lack of "hearing" as such is functional and not organic.

Thus with all other sensory modalities it may be that the visual region places its final "stamp" upon the content of the resulting conscious process.

This view is suggested further by the fact that kinesthetic imagery followed by incipient movement does not necessarily involve a visual process until a very high degree of definiteness is attained. It is consistent with the logical necessity of regarding sensory and motor impulses as equally responsible for consciousness and with the view that consciousness is akin to "motor" adjustment or possibly an incipient stage of "motor" adjustment.

To call synaesthesis a conditioned reflex does not explain the phenomenon. It merely gives it a functional name, or label, which perhaps leads us to an appropriate description of synaesthesis. It will not tell us how the color was substituted for the normal stimulus. We draw upon the notion of irradiation in attempting to solve the latter problem. We cling to the notion of the conditioned reflex *nature* of synaesthesis because it provides for its great variability from individual to individual and for its stereotyped features; and opens a way to envisage more clearly its meaning-function.

After all, as to just what content shall function in a meaning process is an arbitrary and artificial matter as far as the content itself is concerned. The content is only a means to an end in that it is the method or mode by which the function takes place. The contents are conditioned and have no inherent worth as peculiar or unique meaning carriers. For example, most any sort of process from a visual perception to a vocal-motor image may mean a consciousness of a task. The contents concerned in the development and functioning of meaning are conditioned as much as the flow of saliva in response to a tuning fork. As long as the dog's mouth watered in response to a tuning fork in Pavlov's experiments the "tuning fork-saliva" situation meant "meat." We do not intend to argue in a circle and to imply that meaning is a conditioned reflex because a conditioned reflex is a certain form of arbitrary meaning. We are arguing that the two phenomena are functionally identical.

That meaning is a reflex phenomenon is substantiated on the ground that the former must be a *process*. One mental content must lead to another before meaning is present. This shift, this action, this stimulus response function *is* meaning. Factors exter-

shall be in any given instance. After meaning has once developed it is the inevitable shift from one content to another which is the meaning finally, rather than the contents themselves. We can see no danger in regarding meaning as a conditioned reflex!

It is interesting to note, in passing, that Lowie (6) has drawn a parallel between synaesthesis and peculiar associations which evolve especially among primitive races. For example the Dakota Indians associated "lozenge" with whirlwind; for certain Plains tribes black meant victory or joy; the Cherokees associated "white" with "south," "red" with "east," "black" with "west," and "blue" with "north"; certain figures represented good fortune or prosperity. Primitive man had preferential estimates of certain numbers. Wells (10) sees a possible similarity of function between symbolism, including autistic thinking, and synaesthesis. These are noteworthy recognitions of the significance of synaesthesis as a process of meaning.

Mudge has recently made a brief study of the types and qualities of visual imagery which asynaesthetic subjects associate with musical productions (7). The author apparently assumes, and we believe correctly so, that there is no sharp dividing line between synaesthesia proper and tendencies to associate visual imagery with focalized auditory qualities. But, as our present investigation shows, the synaesthesia which Mudge characterizes as exaggerated differs from the tendency to associate visual imagery with focalized auditory qualities in that in the former the visual associates are necessary in perceiving in auditory fashion. We do not doubt, however, but that such visual associates as Mudge has described assist in the development of meaning, although the investigation does not mention the problem of meaning. It would be practical and more appropriate to confine the term synaesthesia to such acts of perceiving or of comprehending in which the primary process remains nonfocal.

SUMMARY

1) Our blind synaesthetic reagent possesses an entoptic phenomenon which is apparently due to inherent retinal light. By means of this phenomenon his synaesthetic colors have apparently been kept "alive." His entoptic colors are clearly distinguishable from his synaesthetic colors. The former are sensations and the latter are images.

2) A's synaesthetic imagery differs from his asynaesthetic imagery as follows:

a) It can be held before consiousness indefinitely by resorting to repetitions of the nonvisual process for which the synaesthetic imagery stands;

b) it functions independently of specific outline, shape or form for the reason that unlike the asynaesthetic imagery it is not a direct construction of a visual scene or object;

c) it does not function as does other visual imagery as a secondary or supplementary process in connection with non-visual processes;

d) here attention is invariably centered upon color or brightness first and secondarily upon outline or form while in asynaesthetic imagery size, shape, contour, etc., may be equally important features;

e) synaesthetic imagery functions differently in the development of meaning in that unlike ordinary visual imagery it identifies experiences which in the asynaesthetic individual are nonvisual.

3) *A*'s visual imagery appears in an entoptic visual setting and on a diffuse and always nonfocal kinesthetic background. *B*'s visual imagery invariably appears in a kinesthetic setting, never in a visual setting. Both reagents agree that visual imagery is more stable when it appears in connection with imagery of other modalities or when accompanied by incipient movement. *B*'s visual imagery resolves itself almost at once into tactual, auditory or kinesthetic processes. It cannot be compared with *A*'s in matters of stability, detail, and sequence.

4) Both reagents agree that it is easier to visualize objects which have been handled in tactual-kinesthetic fashion.

5) In recalling visual imagery *A* uses visual as well as other cues. *B* uses cues which are derived wholly from nonvisual modalities.

6) *A*'s nonvisual imaginal life consists first of an indescribable consciousness which, with the sole exception of kinesthetic imagery, can become a datum of consciousness only through the medium of visual synaesthetic imagery. *A* knows of the presence of this type of consciousness by means of changes in the behavior of the synaesthetic image. In like fashion he ascribes to this vague consciousness its implied "attributes" of quality, intensity, and duration. Without using visual associates he is aware only that "something" was present. Further, unless accompanied by visual synaesthetic imagery, there seems to be no possibility of knowing that this parent process ever was present or is present. In other words no image other than visual, with the one exception of kinesthesis, can stand alone in consciousness. The vague, imaginal parent process is always something from which *A* finds his attention shifting. It is always a "step behind" focal attention.

7) These facts, checked against data from *B*, show that synaesthe-

tic imagery in *A*'s case function as essential components in the development of meaning and that synaesthetic phenomena are themselves the development of meaning; they are acts of cognizing. In *B*'s case nonvisual imagery rises into focal consciousness in the presence of a dominantly kinesthetic background. As such images develop in his consciousness they are meanings. These meanings are stereotyped. In *A*'s case this development of meaning is functionally the same but it involves the presence of a stereotyped visual process. In the two cases the mental contents differ but the functioning of such contents as are present is the same.

8) *A*'s early memories are confined exclusively to visual imagery. Experiences originally derived from nonvisual modalities are recalled in terms of detached synaesthetic associates. *A* possessed synaesthetic phenomena as far back as he can remember. Original affective experiences are recalled in terms of synaesthetic imagery. Checked against *B*'s early memories, *A*'s data show that synaesthetic imagery consists of meaningful processes which identify original experiences as auditory, tactual, kinesthetic, or emotional in their origin.

9) While considerable evidence points to the fact that *B*'s early memories have undergone considerable change in their content from visual to auditory or to kinesthetic factors, *A*'s early memories have suffered practically no such distortion. Tests over four years of time bear out this fact. *B*'s early memories show by contrast the functional significance of synaesthetic processes in *A*'s early memories. Evidently the presence of synaesthetic imagery, which is itself stereotyped, has kept *A*'s original memory contents free from the usual distortion and elaboration found in the process of forgetting. *B* has found it necessary to elaborate or to distort the original content of his early memories in order to retain meanings, since the original contents have become vague and attenuated through processes of dissociation. But in *A*'s case evidences of dissociation are largely confined to the separation of synaesthetic images from their parent processes. Since these detached associates require no such distortion or elaboration as do the asynaesthetic processes of *B* we may look for meaning in the functioning of synaesthetic images themselves. Our introspective data show that this interpretation is justified.

10) *A*'s recent memories are almost exclusively visual in their content. It turns out that immediately after any nonvisual experience has occurred, its visual associate tends to become detached from the parent process. The visual associate thereafter dominates in processes of recall. Checked against data from *B* we find that *A*'s synaesthetic processes in recent memories function as meanings.

11) A comparison of our reagents' early and recent memories shows that forgetting in *B*'s case results in a gradual dominance of kin-

esthetic contents and in A's case in a sudden dominance of visual synaesthetic images. In the former's case elaboration and distortion provide for the retention of meaning and for its simplification. In the latter's case detached visual synaesthetic images themselves function as meanings and, being in themselves stereotyped and simple, require no such distortion or elaboration in providing for the retention of meaning.

12) In A's processes of imagination in which motor attitudes or incipient bodily adjustments are aroused, kinesthetic imagery is less quickly translated into visual synaesthetic images than under conditions in which incipient movement does not take place. For the time being kinesthetic imagery seems to be identified by incipient movement. But if the reagent attempts to attend to these kinesthetic complexes they at once give way to complexes of visual synaesthetic imagery. The immediate arousal of visual associates is apparently unnecessary when a given nonvisual experience leads directly to overt motor adjustments as does the kinesthetic image. But before this entire process can be "cognized" visual imagery must enter consciousness.

13) In A's free associations synaesthetic phenomena function as follows:

a) in the perceiving of the stimulus word;

b) in the persisting of the stimulus word in consciousness together with vocal-motor imagery of the word;

c) as antecedents of further visual imagery;

d) as the responses which are ultimately translated into vocal-motor imagery and innervations of the response word.

Evidence of the cognitive functioning of synaesthetic phenomena is found:

a) in the fact that a synaesthetic visual image functions in the place of a response word;

b) in the fact that a synaesthetic image aroused by the stimulus word means nothing if it does not lead to a verbal image or to further visual imagery, but that it stands for nonvisual imagery if it leads to a response;

c) in the fact that the synaesthetic image must be revived if through faulty attention the reagent fails to perceive the stimulus word;

d) in the fact that the synaesthetic image invariably plays a dominant role in the understanding of the stimulus word;

e) in the fact that synaesthetic imagery frequently determines the direction of the free association;

f) in the false interpretation which the presence of a synaesthetic visual image sometimes leads the reagent to make;

g) in the fact that in recalling the visual associate of the stimulus word during delayed reaction it may seem to the reagent that he is recalling auditory imagery of the word, although no auditory qualities are present to consciousness;

h) in the fact that synaesthetic imagery frequently formed the content of a task consciousness.

A's procedure, checked against *B*'s, reveals the fact that while in *A*'s free associations synaesthetic images are present the functional aspects of his responses are identical with those of *B*.

CONCLUSIONS

One

Synaesthetic phenomena in the realm of *A*'s imaginal life are functionally identical with allied phenomena in his perceptual processes. Synaesthetic phenomena are processes of identifying auditory, tactual, or other nonvisual "images." Visual synaesthetic imagery of color or of brightness constitute an invariable and integral component of such "images."

Two

There exists in *A*'s mental life a nondefinitized, vague, nonfocal set of experiences which become data of consciousness only through the medium of visual synaesthetic images. It is the "raw material" from which definitized images or meanings develop. It is indescribable and is always a step behind attention.

Three

The so-called "secondary sensation" in *A*'s synaesthesia is invariably a visual image.

Four

The synaesthetic imagery which functions in imaginal synaesthesia is throughout identical with the synaesthetic imagery which functions in corresponding perceptual synaesthesis.

Five

The behavior and the attributes of the visual image in A's synaesthetic phenomena reveal the presence or absence of the parent image. This also holds for perceptual synaesthesia.

Six

The visual associate fails to identify the parent image in the absence of the latter or when the visual image fails to lead to further mental processes. This holds also for perceptual synaesthesia.

Seven

The visual associate persists as long as does the primary image and frequently longer. The visual associate may be prolonged or retained indefinitely in consciousness if the reagent succeeds in arousing the primary image. The situation also obtains in perceptual synaesthesia.

Eight

The intent to attend to the primary image results in a clarification of the visual associate rather than in a focalization of the parent process. When the reagent is instructed to ignore the visual associate both the parent process and the visual associate disappear and the reagent's attention is claimed only by visualized strains of attending. This is also true of perceptual synaesthesia.

Nine

The only differences which we have found between perceptual and imaginal forms of synaesthesis accrue to the differences by which the two forms are stimulated. In the former a visual image cannot arouse an auditory or tactual perception or lead to a fixation of attention upon an auditory or tactual sensory experience in the absence of peripheral stimulation. In the latter, a visual image may arouse its tactual or auditory parent process.

Ten

Synaesthesis in our reagent is not confined to the field of perception; it is a cognitive process *per se* pervading his entire mental life as far as it has been studied; functionally it differs in no respect from any process of meaning. Synaesthesis is a process of meaning.

Eleven

Synaesthesis is not a freak phenomenon the explanation of which is

to be sought in a unique organic condition of the brain such as anastomosis or tangling of fibers, lack of differentiation of function, circulation of the blood, and the like. It is a normal mental function whose contents alone differ from the contents of similar functions in the asynaesthetic individual. In our reagent, at least, synaesthesis is not a surplus process but an essential one.

Twelve

The behavior of synaesthesis together with its function in mental life suggest that it is a form of conditioned reflex. The conditioned features of these reflexes are the mental contents which have become stereotyped.

Thirteen

The various arguments which have been advanced in the past in favor of physiological theories of synaesthesia point to the cognitive nature of the phenomenon rather than to its organic nature.

Fourteen

It is suggested that the development of a conscious activity requires discharges from the motor projection areas of the brain; that in the act of becoming conscious of anything, in *A*'s case, the visual area drains from all other sensory regions the impulses there set up by stimulation. In this way impulses which subserve the development of mental activities all pass through the visual area on their way to the motor area. This gives to *A*'s consciousness its dominantly visual character.

Fifteen

The view that synaesthesis is cognitive harmonizes the facts which support the antagonistic physiological and association theories.

Sixteen

We believe that in our synaesthetic reagent's nonvisual experiences we have found processes of the type which we assume characterizes consciousness at birth and of the type which characterizes the consciousness of an individual who has matured but who has suffered total amnesia and has been obliged to begin mental life practically all over again. In other words synaesthesis gives us an opportunity for studying as directly as is possible consciousness in its "undeveloped" or "undifferentiated" state, the state of the abstract sensation. In our reagent it is quite evident that imaginal as well as sensory processes have a direct root in an indescribable and cognitively undifferentiated type of consciousness.

Note: As this monograph goes to press, research work is being done on four sighted, synaesthetic reagents. While none of these reagents are trained introspectors such data as have been gathered confirm the following results:

1) synaesthesia occupies the same functional place in the higher thought processes as it does in perceiving;

2) synaesthesia is a phenomenon of meaning;

3) the reagent does not become aware of the primary process until attention is directed to the secondary process;

4) the secondary process - the image - is not an incidental association; it is a content essential to the reagent's acts of cognizing.

In none of these four reagents is the synaesthesia as widespread as in our synaesthetic blind reagent and where, in the former, mental contents are asynaesthetic, meaning functions and develops as it does in the asynaesthetic person.

It is worth mentioning in passing that throughout this series of investigations we have found no possible clue that the mental processes of the blind are in any way different from the mental processes of sighted persons. Differences are confined wholly to contents and not to functions. It is obviously an injustice to segregate the blind, during their periods of education, from normal social intercourse with sighted persons and sighted children.

We have included in this monograph more introspective data than was perhaps essential to demonstrate our statements in the text. This was done for the reason that our psychological literature is lacking in data on the mental life of the blind. It is hoped that from the introspections herein may be noted the detailed and intensely interesting facts concerning the behavior and characteristics of imaginal processes in the blind. The monograph has run to such length that the writers felt it unwise to attempt here a summary of these facts inasmuch as the purpose of the research was not to study the mental life of the blind but the phenomenon of synaesthesia. A detailed analysis of much of this imagery is to be found in the main body of the text. To those who are interested we extend a hearty welcome to use these introspections toward the fulfilling of such purposes as they desire.

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ROLE OF EMOTION IN A SYNAESTHETIC SUBJECT: SUMMARY AND DISCUSSION

1) Insofar as this investigation relates to the previous work of Wheeler and Cutsforth, the present results are in entire accord with those obtained heretofore. Principal among them are the following.

a) The process of synaesthesia is distinctly a process of perceiving or of cognizing, the associated imagery of which plays the same role in synaesthetic *S*s as in asynaesthetic *S*s. The only difference in the perceptions of the two groups of individuals is the stereotyped and highly colored character of the secondary increment in synaesthetic individuals.

b) The associated colors provide the context necessary in the development of meaning. Constituting a part of that context is a process which the *S* is unable to describe. Any attempt to define it results in a centering of attention upon some feature of the associated image. We have chosen to give the name "parent process" to this phenomenon. It seems to be that increment which in asynaesthetic individuals is referred to as an olfactory, auditory, cutaneous, or kinesthetic quality. Presumably it may be called sensation as such. Its presence and absence are noted in a total-perception of any given experience; but when this noting becomes at all specific the *S* finds that he is referring to internal movement or "vitality" of the experience. Beyond this, little can be said about it at present.

c) The absence of this parent process is one of the identifying features of synaesthetic imaginal experiences as opposed to "objective" experiences.

d) In certain individuals at least, synaesthetic phenomena pervade the entire mental life. It so happens that this statement has been true of all cases studied intensively up to the present time.

2) Our *S* is completely synaesthetic. Not only are the perceptions in all nonvisual modalities characterized by the absence of nonmodal qualities as such, but visual perceptions and visual images are also in part emotional in their interpretative stages. Synaesthesis runs not only into the use of visual imagery, but also into visual imagery whose significance is emotional and tac-

tual. That is, visual perceptions contain color imagery of a synaesthetic character.

3) Within the limits of this investigation all of *E*'s mental processes, other than the highly mechanized, contain an emotional increment present in terms of color imagery. This emotional increment is present in inverse ratio to the degree of mechanization of the mental process in question. Thus, mechanization and attenuation are characterized not only by the loss of form, position, internal movement, and detail, but also by desaturation of the colors having emotional value. In other words, mechanization, in *E*'s case, involves the process of approaching indifference. This situation is analogous to the diminution of meaning which results, in asynaesthetic individuals, in an approach to the sensory level of experience.

4) The same colors, under different interpretative mental sets, function as emotion, as tactual, or as auditory perceptions.

5) The presence of emotional increments in *E*'s perceptual processes seems to hark back to emotional reactions of early childhood common to visual, auditory, and tactual stimulations; and the common denominator, or medium of association between visual, auditory, and tactual meanings now operative in *E*'s mental life, is color imagery functioning as emotion.

6) Particularly evident, as an example of this situation, is *E*'s tendency to associate melody with objective colors. These associations are not present in terms of auditory images but in terms of an ambiguous emotional synaesthesia. That is, the emotional coloration may refer to the objective color or to the auditory meaning, equally as well, depending upon mental set.

7) This confusion, or what would seem to the asynaesthetic *S* to be a confusion, between feeling and intellectual processes shows how closely the two modes of response are related. Indeed, it seems evident that it is impossible to differentiate between the two except upon interpretative grounds. In *E*'s case generalized or undeveloped perceptions are always as emotional as they are cognitive. In case of a full-fledged perception which passes through observable stages of definitization or elaboration, the first stage of development is a feeling process whose imagery becomes modified and elaborated as the perception becomes concrete and the object is identified.

In *E*'s case, therefore, emotion and cognition are not to be described by differences in content but by differences in attitude. The two modes of response are not to be contrasted in terms of aspects. The difference is a derived phenomenon, representing two successive stages in the course of development of a perceptual process. Neither the emotional nor the so-called cognitive

stage of a perception is a matter of immediate experience; i.e., they are not existential but interpretative phenomena. We are inclined to suspect that these facts are equally true of all individuals.

8) Our results seem to throw light upon the problem of the stimulus or meaning-error. Tactual, auditory, and emotional factors in *E*'s mental life, existing alone or in mixtures, are distinctly meaning phenomena, unanalyzable except in terms of meaning, whose only observable content is visual. Tactual, auditory, or emotional significance appears only in a total and complex experience; it is a characteristic of the complex as such, not something which can be reduced adequately to single contents of a sensory character. We are not here promoting the theory of imageless meanings, but we are inclined to believe that meanings are in themselves contents, deriving their structural character from synthesis. This explains why, when perceived as a whole, a certain experience possesses a definite tactual or auditory meaning; but, when analyzed into its ingredients, loses its original character and becomes nothing but visual imagery. The difference between the synthetized and the analyzed state is to be explained in terms of mental set. In other words, the problem is a functional one. The logical conclusion from this, of course, is the view that every experience contains an irreducible increment - the meaning quality prior to analysis; and that no experience, however simple, exists in the absence of this functional phenomenon. In other words, as defined by conventional psychology, there is a meaning-error in every mental process. This is no other than the interpretative factor characteristic of every perception.

9) It would seem that in *E*'s case visual perceptions involve a parent process. The redness, yellowness, greenness, etc., are in reality such parent processes camouflaged, as it were, by mechanized associations of long standing, and simplified to such an extent that the awareness of color seems to be an elemental experience. But on more careful analysis this elementary character of the experience turns out to be a meaning-phenomenon and therefore complex. The ordinary *S* finds hue, saturation, brightness in his visual reactions so immediately as to lose the associative processes by means of which these colors become a phenomenon of awareness. On the other hand *E* brings such apparently extraneous associations to bear upon her objective vision as musical meanings whose contents are visual, synaesthetic images. These associations are so definite as to make possible judgments of pitch. It is a curious fact that these auditory associations are not auditory in content, for auditory processes, both sensory and imaginal, are visually synaesthetic. Hence auditory perceptions, both of direct and indirect character (by way of auditory stimulation or roundabout association), are meanings whose content is visual. So far as we have been able to determine, where such auditory or emotional associations are not present, *E*'s con-

sciousness of color is vague and indescribable.

10) We may ask the question, why does our *S* insist upon describing so many of her experiences in terms of emotional coloration? Why can they not be described simply in terms of brightness and color qualities? Obviously for the simple and ample reason that it is impossible; for without this emotional reference the experience ceases to exist. To inhibit the emotional significance means to alter the total experience in such fashion as to make an entirely different sort of thing out of it. The same thing is true for the tactual increment in *E*'s perceptual processes. *E* is utterly helpless in attempting to describe this tactual experience in any other terms than meaning. Opalescence and etherealness are as much attributes, for her, apparently as granularness, arealness or whatnot are for the conventional laboratory *S*. Attributes are seemingly indeterminate in a last analysis.

11) Foremost in *E*'s mental life is the process of interpreting. This is functionally elemental and depends upon the circumstance that the simplest possible experience is a complex. Introspectively it is impossible to get beneath the percept with its interpretative factor. It seems to the writer that this fact has not been taken into account sufficiently in systematic discussions.

12) The role of emotion in *E*'s mental life is twofold. First, it functions in undeveloped perceptions, and secondly, as the end stage in elaborate recognition processes. Consequently, in a certain proportion of her memory processes, where mechanization has reached its limit, emotional coloration has all but disappeared. In the remainder of her recalls the emotional contents, in terms of synaesthetic colors, remains in varying amounts up to complete predominance. In her case, of course, emotional experiences as such are recalled definitely in terms of visual images. We have come to the conclusion that, in a last analysis, feeling processes are undifferentiated cognitive processes, i.e., perceptions in which either a labeling or identification process fails to mature, and that this fact holds for asynaesthetic individuals as well. It would seem that in ordinary laboratory investigations of feeling, *S*s have looked for contents whose characteristics and behavior show marked differences from the so-called perceptual reactions. In the light of our results it is evident that, before we can be certain of our psychology of feeling, a great deal more careful experimentation will be necessary, in which more regard is paid to the factor of interpretation in mental life.

AN ANALYSIS OF THE RELATIONSHIP BETWEEN TACTUAL AND VISUAL PERCEPTION

HISTORY

The history of psychology has harbored but few doubts regarding the qualitative specificity of sensations and the discreteness of sensations supposedly conditioned exclusively by different sense organs. Classifications of sensory modalities have been based altogether upon corresponding sense organs and sensory qualities. The result has been that the history of psychology is marked by much greater success in the process of reducing sensory consciousness into small sensory units than in erecting a theory of how these same units become organized into a continuous, dynamic consciousness.

Aristotle, in his *Sensus Communis*, made a mystical attempt to explain how sensory experience regarded as discrete entities were utilized in a conscious whole. However, his doctrine of the 'common sense' did not truly account for structural unity, and only provided a questionable functional whole in which the sensory parts were incorporated.

The doctrine of association lent itself well to the concept of the 'common sense' with the result that it was not until the appearance of Hagen's work (6) that a plausible dissent was heard against the partite sensory composition of consciousness. Hagen suggested that the normal consciousness was visual and that all perceptions were made in terms of this modality.

The doctrine of local signs, of Lotze, and the methodology of Fechner, which was continued by Wundt, added a great superfluity of proof to the belief in discrete sensory qualities. It was not until the time of Philsbury, Judd, Washburn, and Parrish that any evidence to the contrary was produced (7,8,9,11). These four studies failed entirely by using different methods to separate visual processes from those of touch and kinesthesis.

All during the nineteenth century cases of synaesthesia had been reported but since they were described and explained in the terms of associationism which assumed that the synaesthetic sensation was a secondary process accompanying the primary sensation, the validity of the primary sensation was not challenged.

Stratton (10), in his experiment on the effects of retinal inversion, found that the perceptions primarily of touch and

kinesthesis were inextricably bound up with those of vision. His results furnish more evidence than he himself saw. However, through his adherence to the doctrines of local sign and association he was unable to make use of these valuable observations. The unemphasized results of Stratton were confirmed in the work of Brown (2) and Wooster (13).

Benussi (1), in 1913, was able to demonstrate apparent movement in the field of touch. Later, Burtt (3) was able to varify Korte's laws in the tactual modality. Since then numerous studies have been made which emphasize different phases of apparent movement. In all of these instances the importance of visual processes for apparent movement can hardly be ignored.

Wheeler and Cutsforth (12) have shown that synaesthesia does not consist of a dual process in which the 'secondary sensory' experience is an associative concomitant of the 'primary sensation.' The synaesthetic process is all that exists in the experience and without it no experience would be possible. The undifferentiated 'parent process' is all that exists of the primary sensation and that does not even possess awareness of quality. It is merely a cognitive reference, a 'pretemporal' awareness.

In 1920 Gelb and Goldstein (5) reported the case of a soldier suffering from a wound in the occipital region. The patient lacked visual memory and complex visual perceptions, and at the same time, failed to localize tactual experience when blindfolded, except as he made use of bodily movement.

In 1929, Forster (4) reported a study on mirror learning in which it was shown that motor learning depends on visual processes.

These studies and many others raise the question whether, after all, the orthodox conception of the sensory field, as one composed of discrete sense modalities, is correct. If the *Gestalt* theory is correct the orthodox conception is wrong, and a strikingly different view from that formerly prevailing must be held. The issue specifically is this: Do full-fledged perceptions develop independently in each modality, and are they to be explained in terms of sensory elements? It was in the interest of adding to the solution of this problem that the present study was undertaken of tactual-visual perception.

PROBLEM

The problem of whether the sensory field can legitimately be divided into discrete modalities such as visual, auditory, tactual, and so on, each qualitatively and functionally distinct from the other, is a problem of intermodality relationships. The method

by which it was attacked in this investigation consisted in general of requiring that a perception, supposedly originating and developing in one modality, be reproduced or duplicated in another. The two modalities selected were the visual and tactual-kinesthetic, and the specific problem with which this study was concerned was the analysis and description of the mental processes involved in estimating size tactually and kinesthetically and of reproducing that size visually. It was hoped that this procedure, which demanded a shift from one so-called sense modality to another, would furnish some cues regarding their dependence or lack of dependence. Means were adopted, as far as possible, of securing quantitative data of statistical reliability.

PRELIMINARY EXPERIMENTS

Prior to the adoption of the procedure finally employed, four preliminary methods and a total of 51 subjects were used. Although the preliminary studies produced quanities of positive material and furnished considerable insight into the nature of the problem it was necessary to abandon each successively due to some inherent defect within the method. All the preliminary methods employed concrete stimuli to be judged in relation to other concrete objects with the result that it was impossible to control the factor of learning a range or series of standards. This learning caused judgments to be rendered in terms of the entire series or in terms of previous judgments, and unnecessarily complicated the quanitative data.

APPARATUS

The apparatus used for the purpose of securing visual judgments of tactual size consisted of a semi-horizontal hand screen and a vertical board on the front of which was an adjustable diaphragm (see Figure 1). The hand screen was made of 1/2-inch pine board 10 by 28 inches. It was mounted 6 inches above the end of a laboratory table upon two 1/2-inch pine boards 10 by 6 inches. The front opening was covered, with the exception of 10 inches at the right, by a black cloth curtain hung from the edge of the screen. At the back edge of the board screen mounted on rods and clamped to the table was the vertical board, 1/2-inch thick by 28 by 10 inches. Set out 1/2 inch from this vertical board was a black cardboard front with an aperture exposing a rectangle of white tagboard 60 by 40 mm. Between the black front and backboard was inserted a sliding diaphragm which would shut off all the white background from the left. Also back of the black front, and in front of the sliding diaphragm, was inserted a black cardboard diaphragm which shut off the aperture from the top down. The vertical diaphragm operated on a slide which was manipulated by the observer's left hand in trombone fashion. The diaphragm coming down from the top was

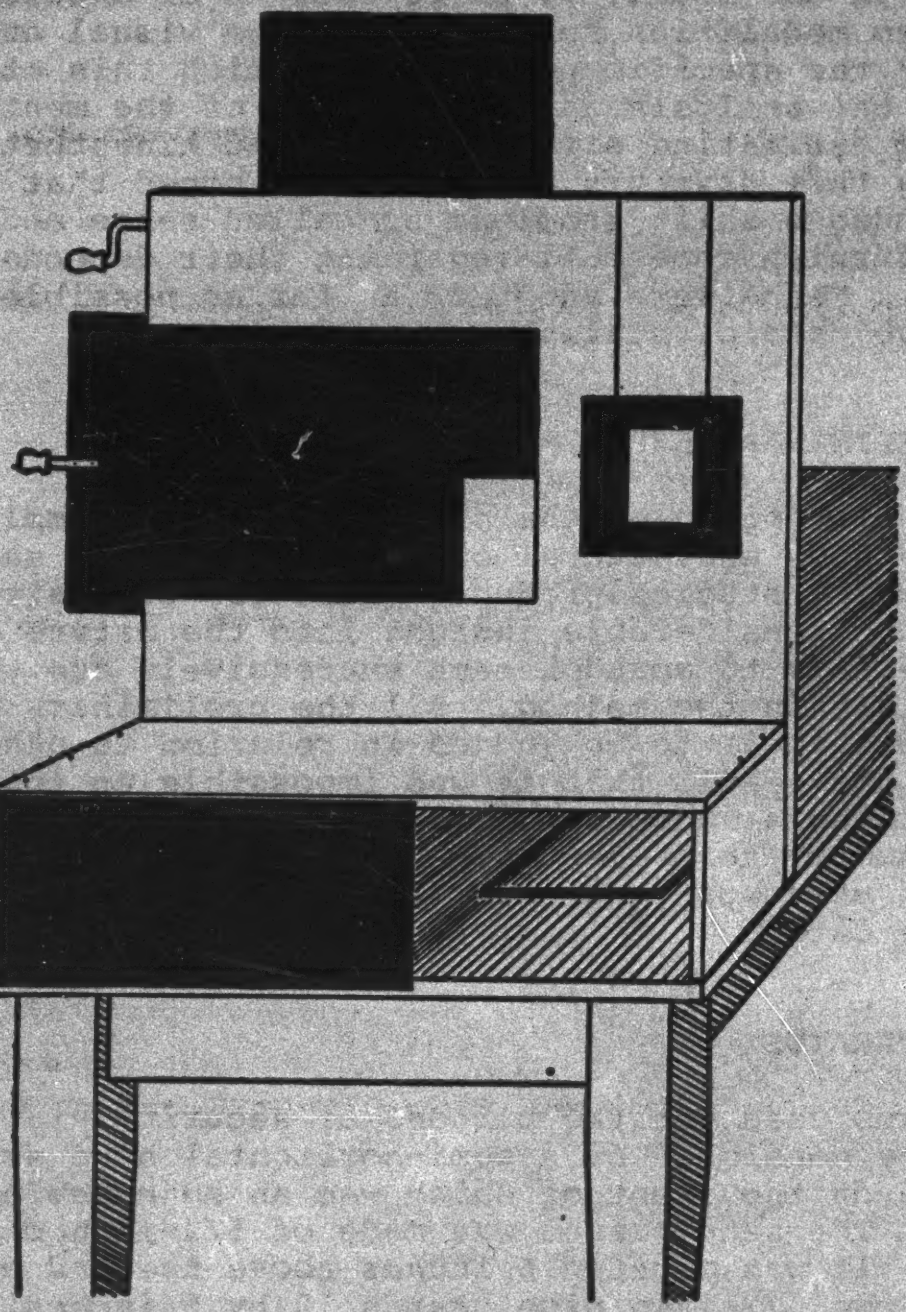

Figure 1. Diagram of Apparatus to Show the Relation of Tactual and Visual Perception.

mounted upon a sliding carriage, manipulated higher or lower by a crank, also at the left.

Attached to each diaphragm and extending through slots in the backboard were pointers which moved along millimeter scales. Readings could thus be taken off the scales by the experimenter behind

the apparatus. The scales and experimenter were hidden from the observer.

Beneath the hand screen, at the right end of the apparatus, was located a horizontal and vertical metal cardholder about 3 inches behind a hole in the screen through which the observer extended his hand. The cardholders held the tactual objects which the observer was to explore with his right hand hidden from view.

Five rectangular wooden figures were cut from 1/2-inch triple pine veneer in the following dimensions:

No. 1, 120 by 80 mm; No. 2, 90 by 60 mm; No. 3, 60 by 40 mm; No. 4, 45 by 30 mm; No. 5, 30 by 20 mm.

These blocks were mounted upon separate cardboard squares 6-1/2 inches by 6-1/2 inches that slipped into the metal cardholders.

One white tagboard rectangle 60 by 40 mm was mounted on a 6-inch square of black cardboard to which were attached wire hooks so that it might be suspended from the top of the screen adjacent to the aperture previously described. The purpose of the visual rectangle will be described in the text.

MAIN EXPERIMENTS

Methods

The investigation proper was divided into two parts. The first was performed with a group of 10 trained observers made up of 10 male members of the staff and graduates from the department of psychology. The second group consisted of 120 naive observers - students from the elementary laboratory classes.

The experiment was performed in a dark room under the constant illumination of a 100 W incandescent lamp. The trained subjects made 52 judgments at each of six sittings held not less than 7 days apart and not more than 21 days. The naive group served as observers but once, during which sitting each made 15 judgments.

The observer was seated in an ordinary chair in front of the apparatus with the adjustable diaphragm, so that it was convenient and comfortable for him to employ his right hand in the act of examining the tactual objects held in the cardholder, and at the same time manipulate the diaphragms with his left hand. His position brought the center of the diaphragm in the center of the field of vision. The observer was asked to examine the figure with his right hand tactually, and when he had perceived its size to adjust the diaphragms until an area of white tagboard was ex-

posed which duplicated the tactual figure. This procedure was employed with both the trained and naive observers.

The trained observers were divided into two groups of 5 each. At the first sitting the members of the first group made 2 judgments which were purely visual. They were asked to reproduce upon the diaphragm the perceived size and form of a white piece of tagboard 60 by 40 mm, hung from the top of the apparatus just at the right of the aperture. One judgment was made at the beginning and the second at the end of the sitting. This was done for the purpose of checking the accuracy with the mechanical devices of the apparatus. In addition, these observers were asked to make 10 reproductions each of the tactual figures in the order as given,

No. 1, 120 by 80 mm; No. 2, 90 by 60 mm; No. 3, 60 by 40 mm; No. 4, 45 by 30 mm; No. 5, 30 by 20 mm.

During the first sitting of this group the figures were presented in a horizontal position with the long axes running north and south, map-wise. Also, at the first sitting these observers perceived the tactual figure by the method of 'passive touch,' that is, of placing the hand and fingers upon the figure without making exploratory movements. This will be called the Horizontal Passive procedure (H.P.).

In the second sitting of this group the observers were permitted exploratory movements of the index finger confined to the edge of the figure, the Horizontal Active (H.A.) procedure. On the third sitting the observer was permitted to employ any method of tactual-motor examination which suited him, the Horizontal Voluntary (H.V.) procedure.

On the fourth sitting the figure was changed to a vertical position with the long axis of the figure running up and down. On the fourth, fifth, and sixth sittings the methods of tactual perception were repeated in order as in the horizontal position. These are to be called the Vertical Passive (V.P.), Vertical Active (V.A.), and Vertical Voluntary (V.V.) methods.

With the second group of 5 trained observers the procedure varied only in that the first sitting started the first of the vertical positions and the fourth started the first of the horizontal positions. Total number of judgments in all by trained observers was 3120, 50 judgments covering the 5 figures in each of three procedures, within two sets of positions of the figures. This number included the visual judgments.

The 120 naive subjects were divided into four groups of 30. Each group made the two visual judgments as before using the white visual rectangle; and each judged two series of 5 rectangles in one of the four methods, H.P., H.A., V.P., and V.A. Group one

made their judgments with the tactual objects in a horizontal position employing the passive method of tactual perception (H.P.). The second group of 30 observers employed the horizontal position of the tactual object using active finger movement of the index finger about the edges of the figures (H.A.). The third group of 30 observers perceived their tactual figures in a vertical position by the static hand method (V.P.), and the fourth group of 30 observers also employed the vertical position of figures, but with exploratory movement of the index finger (V.A.). Total number of judgments by untrained observers was 2040, 17 by each of 120 observers, 30 observers for each of the four methods used. Total number of judgments for the entire main experiment was 5160.

Results

Judgments of Visual Size

The ranges of judgments of height and width by both trained and untrained subjects demonstrate a surprising inaccuracy in matching one visual size with another visual size. The curves of distribution conclusively show the extent of inaccuracy in these judgments both for trained and untrained observers. The distribution of judgments for height, in case of the trained observers, extends from 55 to 67 mm, a scattering of 12 mm, or 20 percent of the standard height. The mode occurs at 59 which is one point below standard height. The untrained observers scattered their judgments of height still further by extending the range from 50 to 68, a range of 30 percent of the height. The judgments of height for the untrained observers form themselves into a bimodal distribution with the points of most frequent judgments falling at 56 and 60.

In the judgment of width, the trained observers scattered out over a smaller range ranning from 37 to 47, with a mode at 42. The range, which represents 25 percent of the standard width, *falls for the most part above the standard*. The untrained observers scattered their judgments over a range, from 33 to 49, which is equal to 40 percent of the standard width. The mode occurs at the same point as does the width of the standard but a larger part of the judgments fall below this point. An inspection of the curves shows that the trained observers are prone both in their judgments of height and width to overjudge the standard, and the untrained observers to underjudge the standard.

The Discrepancy Between Sight and Touch

A large discrepancy was found to exist between the tactually perceived standard and the matched visual equivalent in the judgments of all the subjects made in all the different positions, with all

the different methods employed, and with all the five stimuli. Underjudgments of the tactual standard were made to the extent of 44 percent of its size, and overjudgments of the standard ran to 47 percent with an average discrepancy running as high as ±12 percent for certain of the stimuli. The ranges of distribution are modified by the different positions, methods, and standards employed. (Figure 2A shows underestimation of W and H.)

The Effect of Position on the Discrepancy Between Sight and Touch

The horizontal position is conducive to more accurate judgments than the vertical position. The different effects of the two positions can be seen from Tables II and III. Table III shows the discrepancies for height and width for the horizontal and vertical positions separately. These differences do not remain constant for all methods and all sizes, and also vary between observers. The differences between the horizontal and vertical positions and between trained and untrained observers is revealed not only in the two ranges of judgments which differ in extent, but also in the places along the distribution where the greatest number of judgments fall.

Effect of Passive and Active Exploration on the Discrepancy Between Sight and Touch

The two methods of examination of the tactual standards - passive and active - produce different ranges of distributions of judgments. The effect of the two methods is displayed in Tables II and III. In Table III the extent of the discrepancy between the actual tactual standard and the matched visual size is given. The results show that the active method reduces the extent of overjudgments and increases the extent of underjudgments in both the height and width. That is, it shifts the range of distribution farther below the tactual standard. This effect becomes less apparent on the smaller blocks, and is less apparent for naive than for trained observers.

The effect of movement upon tactual perception would indicate that tactual space was less apparent during movement than when the hand was in a passive state. The fact that the trained observers exaggerated this tendency as compared with the untrained observers would indicate that the trained observers possessed perceptual equivalents for a less amount of the finger movement than did the untrained observers. The trained observers, also, moved more slowly than the naive.

It is not to be contended that it is possible to separate entirely the effects of the combined influences of position and movement. It can be seen that passive judgments made from a horizontal position are distinctly different from those passive

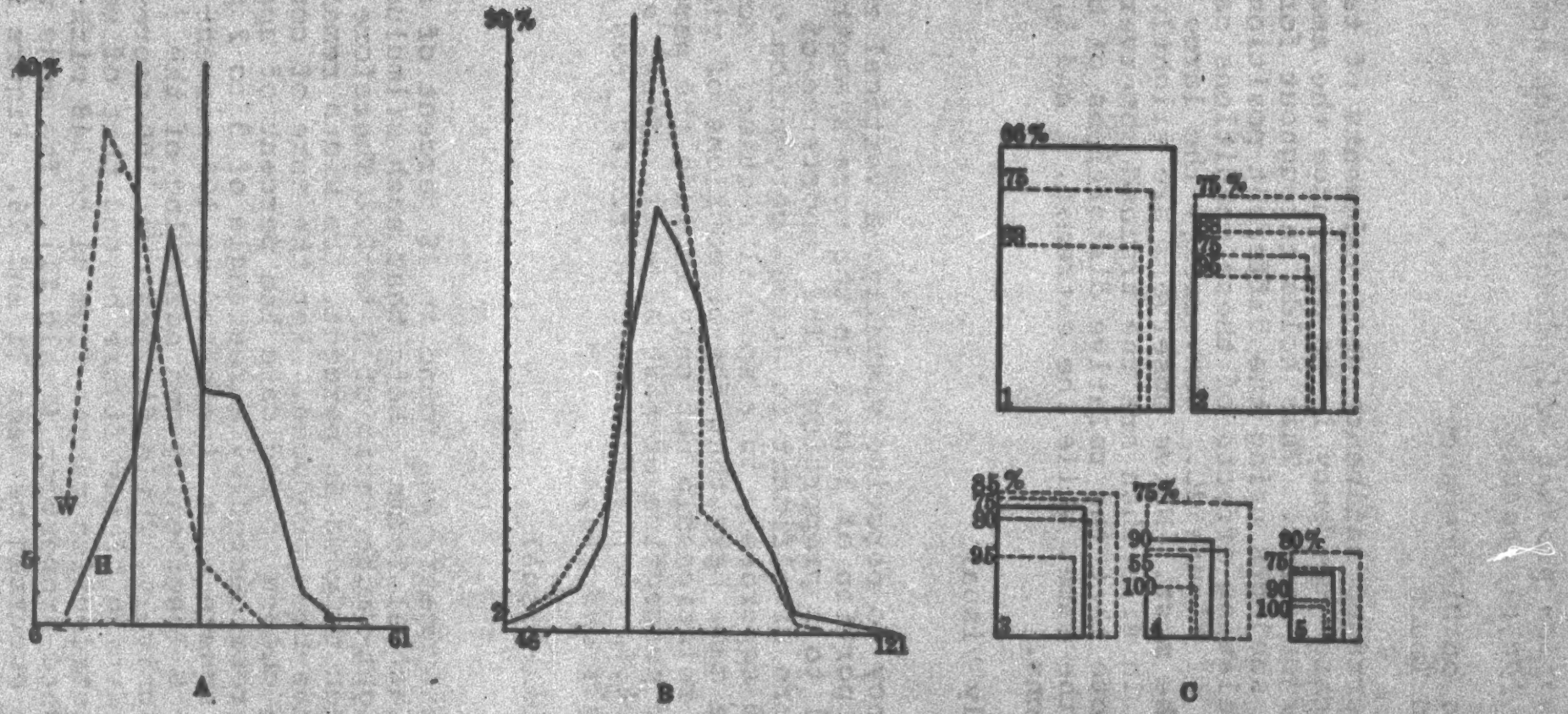

Figure 2. A: Judgments by percent. Block 5. All methods. W, width; H, height. Abscissa, scale in millimeters. Vertical solid lines represent dimensions of Block, 20 mm and 30 mm. B: Distribution of squaring proportions. All subjects and methods. Solid line, untrained; dashed line, trained. Abscissa, arbitrary scale. Solid line represents ratio of W and H. Actual stimuli. C: Squaring judgments. Numbers, percent of squaring. Solid lines, actual stimuli.

judgments made in a vertical position. *But, each of the two conditions in combination produce relationships which neither can be held responsible for separately.*

Influence of Size on Discrepancy Between Sight and Touch

Size of block exerts an influence upon judgments of tactual size (Table I). The chief tendency is to overjudge the smaller sizes more than the larger sizes. This holds throughout for all the judgments by all subjects using the different positions and methods. The interrelating effects of these conditions can be seen by an inspection of Figure 2C. Conversely, the large sizes are underestimated the most. Naive observers are slightly less affected by difference in size than are the trained observers. It is interesting to note that the relative distortions of blocks 2,3, and 4 are about the same, while the extremes, 1 and 5, show the extreme distortions.

Symmetry in Purely Visual Judgments

There is a tendency to perceive visually, a vertical rectangular figure of the proportion of 3 to 2 in the more symmetrical relationship of a 1 to 1 proportion. The importance of this tendency is still more significant in actual perception of form and will be discussed separately in a special section. However, the suggestion may be made here that the perceptions of visual proportion and form relationship not only include the perception of form but also the perception of *size* as well. *Size, of necessity, is a perceptual whole that cannot be constructed from separate judgments of height and width.*

Symmetry in Tactual-Visual Perception

A tendency toward symmetry was found in 78 percent of all judgments made from tactual forms. Note that each stimulus-figure possessed the height-width ratio of 3 to 2. Therefore, when the height has been reduced 66 percent, the width remaining constant, a square has been produced. For the sake of convenience the number 66 was chosen to indicate the percent of approximation to a square represented by a rectangle of 3 to 2 proportions; a perfect square being indicated by 100 percent. Numbers below 66 indicate a lengthening and narrowing of the 3 to 2 proportions respectively, while figures over 100 represent a shortening and widening of the figure beyond that of square proportions. The distribution ranges from 41 to 148 with 66 representing the standard proportion (Table II). The mode of the squaring tendency occurred between 71 and 76. Figure 2B pictures the ranges of squaring graphically.

TABLE I

OVERESTIMATIONS AND UNDERSTIMATIONS - NUMBER OF CASES OUT OF SIXTY

	Block 1		Block 2		Block 3		Block 4		Block 5	
	Tr.	Naive	Tr.	Naive	Tr.	Naive	Tr.	Naive	Tr.	Naive
Overestimations of Height and Width										
H.P.	14	12	14	12	22	19	23	23	24	22
H.A.	1	20	14	23	19	28	19	27	26	35
V.P.	21	10	28	10	21	10	19	19	14	29
V.A.	6	5	11	9	18	19	16	20	16	25
Total H.	15	32	28	35	41	47	42	50	50	57
Total V.	27	15	39	19	39	29	35	39	30	54
Total P.	35	22	42	22	43	29	42	42	38	51
Total A.	7	25	25	32	37	45	35	47	39	60
Total All	42	47	67	54	80	76	77	89	80	111
Underestimations of Height and Width										
H.P.	42	27	28	27	27	26	27	12	20	24
H.A.	35	25	29	18	36	13	37	10	26	8
V.P.	30	26	25	25	37	22	37	15	38	14
V.A.	36	28	44	29	41	22	48	15	37	10
Total H.	79	52	57	45	63	39	64	22	56	32
Total V.	66	54	69	54	78	44	85	30	75	24
Total P.	72	53	53	52	64	48	64	27	68	38
Total A.	71	53	73	47	78	35	85	25	63	18
Total All	143	106	126	99	141	83	149	52	131	56
Underestimations of Height and Overestimations of Width										
H.P.	5	17	17	19	10	14	10	22	3	13
H.A.	24	15	15	18	5	19	5	22	7	13
V.P.	9	24	4	23	4	26	3	25	1	17
V.A.	19	26	14	21	6	19	8	23	6	18
Total H.	29	32	32	27	15	33	15	44	10	26
Total V.	26	50	16	44	10	45	11	48	7	35
Total P.	14	41	21	42	14	40	13	47	4	30
Total A.	43	41	29	39	11	38	11	45	13	31
Total All	57	82	50	61	25	78	26	92	17	61
Overestimations of Height and Underestimations of Width										
H.P.	0	3	0	2	0	1	1	3	2	1
H.A.	0	0	0	1	0	0	0	1	1	4
V.P.	0	0	0	2	0	2	1	1	6	0
V.A.	0	1	0	2	0	0	0	2	5	7
Total H.	0	3	0	3	0	1	1	4	3	5
Total V.	0	1	0	4	0	2	0	3	11	7
Total P.	0	3	0	4	0	3	1	4	8	1
Total A.	0	1	0	3	0	0	0	3	6	11
Total All	0	4	0	7	0	3	2	7	14	12
Totals										
Over H. & W.	42	47	67	54	80	76	77	89	80	111
Under H. & W.	143	106	126	99	141	81	149	52	131	56
U.H.O.W.	57	82	50	61	25	78	26	92	17	61
O.H.U.W.	0	4	0	7	0	3	2	7	14	12

	Naive and Trained Combined				
Over H. & W.	89	121	150	166	191
Under H. & W.	249	225	222	201	187
U.H.O.W.	139	111	103	128	78
O.H.U.W.	4	7	3	9	26

Total cases 1200; 60 judgments of each block in each position or method.

TABLE II

MEDIAN SQUARING TRAINED SUBJECTS

	Block 1		Block 2		Block 3		Block 4		Block 5	
	H	W	H	W	H	W	H	W	H	W
Subject R.K.										
H.P.	77.5	95.6	89.3	103.0	109.0	114.0	120.0	122.0	143.0	130.0
V.P.	100.0	114.0	112.0	129.0	117.0	116.0	132.0	123.0	122.0	100.0
H.A.	97.5	115.0	110.0	126.0	113.0	125.0	137.0	130.0	147.0	130.0
V.A.	100.0	116.0	111.0	131.0	129.0	124.0	136.0	122.0	120.0	102.0
Subject C.W.										
H.P.	99.6	108.0	95.0	102.0	95.9	98.2	94.4	95.0	93.0	100.0
V.P.	82.1	92.5	78.3	90.0	81.7	90.0	76.7	80.0	86.7	90.0
H.A.	90.0	115.0	80.0	93.0	90.8	96.5	88.9	95.0	105.0	108.0
V.A.	91.7	109.0	80.0	95.0	77.5	83.8	77.9	96.7	93.3	98.5
Subject T.P.										
H.P.	82.5	94.4	91.1	107.0	85.0	95.0	91.1	103.0	86.7	95.0
V.P.	79.6	89.0	90.0	100.0	80.8	85.0	80.0	86.7	86.7	92.5
H.A.	80.8	89.4	95.6	104.0	72.4	82.5	97.3	81.7	85.0	103.0
V.A.	75.4	85.0	90.0	100.0	82.5	88.9	82.2	86.7	93.0	100.0
Subject W.W.										
H.P.	72.9	80.6	73.9	85.0	88.2	101.0	105.0	118.0	98.3	120.0
V.P.	99.6	89.4	86.1	96.7	85.8	98.7	91.1	107.0	102.0	110.0
H.A.	61.7	72.5	69.9	82.5	78.3	95.0	87.8	107.0	98.3	122.0
V.A.	62.5	71.9	80.0	86.7	106.0	104.0	120.0	112.0	147.0	140.0
Subject M.R.										
H.P.	77.5	87.5	75.5	83.3	80.0	82.2	73.3	71.7	76.7	65.0
V.P.	91.7	100.0	81.7	84.4	87.5	86.2	88.9	75.0	102.0	70.0
H.A.	91.2	103.0	92.2	107.0	101.0	100.0	104.0	96.7	113.0	97.5
V.A.	103.0	105.0	88.9	95.0	97.5	96.2	97.8	96.7	120.0	80.0
Subject E.N.										
H.P.	103.0	98.7	112.0	110.0	110.0	111.0	116.0	122.0	137.0	125.0
V.P.	88.5	95.0	106.0	108.0	102.0	102.0	110.0	103.0	113.0	105.0
H.A.	107.0	108.0	120.0	117.0	113.0	117.0	110.0	113.0	123.0	115.0
V.A.	102.0	100.0	119.0	111.0	115.0	105.0	112.0	107.0	137.0	113.0
Subject K.S.										
H.P.	84.2	87.5	93.9	103.0	98.8	119.0	108.0	132.0	128.0	152.0
V.P.	85.8	88.1	91.1	96.7	91.7	107.0	95.6	108.0	93.3	105.0
H.A.	82.5	90.6	83.3	99.1	98.8	120.0	100.0	120.0	115.0	135.0
V.A.	63.3	73.1	71.7	83.3	72.5	90.1	34.4	100.0	90.0	112.0
Subject R.W.										
H.P.	83.3	95.0	90.0	100.0	83.3	96.2	82.2	98.3	80.0	90.0
V.P.	103.0	95.0	103.0	117.0	85.9	97.5	85.7	96.7	90.0	87.5
H.A.	57.9	70.0	52.2	68.3	50.0	67.5	51.1	70.0	55.0	80.0
V.A.	70.0	85.0	55.9	73.3	48.3	67.5	70.7	110.0	55.0	82.5
Subject D.P.										
H.P.	77.5	85.0	83.9	95.0	89.1	95.0	88.9	91.6	102.0	100.0
V.P.	56.3	78.7	57.2	79.2	56.7	75.5	51.1	71.7	61.7	85.0
H.A.	75.8	83.6	75.0	85.0	70.0	72.5	67.8	75.0	80.0	80.0
V.A.	67.2	75.0	73.9	79.2	77.5	70.0	83.3	67.3	88.3	65.0
Subject H.B.										
H.P.	113.0	129.0	128.0	147.0	143.0	160.0	140.0	158.0	133.0	157.0
V.P.	117.0	139.0	117.0	141.0	136.0	159.0	133.0	155.0	147.0	190.0
H.A.	94.2	101.0	104.0	114.0	124.0	134.0	117.0	127.0	138.0	140.0
V.A.	90.8	96.2	90.0	104.0	95.9	115.0	100.0	120.0	115.0	130.0

TABLE III

OVERESTIMATIONS AND UNDERESTIMATIONS: TRAINED RELATIVE TO NAIVE: PERCENTS

	Block 1		Block 2		Block 3		Block 4		Block 5	
	H	W	H	W	H	W	H	W	H	W
All Subjects, Positions and Blocks										
H.P.Tr.	—13.7	—3.7	—6.7	4.0	—1.8	7.0	2.0	11.0	7.8	13.4
N.	—5.0	1.0	—7.0	1.0	—5.0	5.0	—5.0	10.0	0.0	15.0
V.P.Tr.	—9.5	—1.9	—7.8	4.0	—7.3	2.0	—6.5	.7	.5	13.6
N.	—10.0	3.0	—12.0	3.0	—9.0	5.0	—5.0	10.0	0.0	10.0
H.A.Tr.	—16.0	—5.1	—10.8	—.4	—8.9	1.0	—3.9	1.6	5.9	11.1
N.	—7.0	3.0	—5.0	8.0	—1.0	17.0	4.0	20.0	10.0	20.0
V.A.Tr.	—17.5	—9.4	—13.9	—4.1	—9.7	—5.5	—3.6	1.9	5.8	2.4
N.	—17.0	2.0	—16.0	1.0	—7.0	12.0	—5.0	16.0	3.0	15.0
Av.Tr.	—14.2	—5.0	—9.8	.9	—6.9	1.1	—3.0	3.8	5.0	10.1
Diff.Tr.	9.2		8.9		8.0		6.8		5.1	
Passive Method										
Trained	—11.6	—2.8	—7.3	4.0	—5.0	4.0	—2.2	5.9	4.1	13.5
Diff.	8.8		11.3		9.0		8.1		9.4	
Naive	—7.5	2.0	—9.5	2.0	—7.0	5.0	—5.0	10.0	0.0	12.5
Diff.	9.5		11.5		12.0		15.0		12.5	
Active Method										
Trained	—16.7	—7.2	—12.4	—2.2	—9.3	—2.3	—3.7	1.8	5.8	6.8
Diff.	9.5		10.2		7.0		5.5		1.0	
Naive	—12.0	2.5	—10.5	4.5	—1.0	14.5	—5.0	19.0	6.5	18.0
Diff.	14.5		14.5		19.5		18.5		11.5	
Horizontal Position										
Trained	—14.8	—4.4	—8.7	1.8	—5.3	4.0	—.9	6.3	6.8	11.8
Diff.	10.4		10.5		9.3		7.2		5.0	
Naive	—6.0	2.0	—6.0	4.5	—3.0	11.0	—.5	15.0	5.0	17.0
Diff.	8.0		10.5		14.0		15.5		12.0	
Vertical Position										
Trained	—13.5	—5.7	—10.8	—.05	—9.0	—1.7	—5.0	1.3	3.1	8.0
Diff.	7.8		10.3		7.3		6.3		5.0	
Naive	—13.0	2.5	—14.0	2.0	—8.0	9.0	—5.0	13.0	1.5	12.5
Diff.	15.5		16.0		17.0		18.0		11.0	
All Positions and Methods Combined										
Trained	—14.4	—5.0	—9.8	.9	—6.9	1.1	—3.0	4.0	5.0	10.1
Diff.	9.4		10.7		8.0		7.0		5.1	
Naive	—9.7	2.2	—10.0	3.2	—5.5	9.7	—2.7	14.0	3.2	15.0
Diff.	11.9		13.2		15.2		16.7		11.8	
All Subjects Combined										
Tr. & N.	—12.1	—1.6	—9.9	1.1	—6.2	5.4	—2.4	8.9	4.1	12.5
Diff.	10.5		11.0		11.6		11.3		8.4	

(For example, -13.7, the first figure in column one, means that trained subjects underestimate height in the horizontal passive method 13.7 percent. The first figure in column two means that trained subjects underestimate width of block No. 1 3.7 percent in the horizontal passive method.)

Effect of Passive and Active Methods on Symmetry

The two methods of tactual exploration of the standard had opposite effects upon the tendency toward symmetry. The untrained observers do less squaring when the form is perceived passively and increase the amount of squaring when movement is employed in making the perception. The trained observers do their greatest amount of squaring in the method of passive exploration and decrease the amount of squaring when movement is employed. This shows clearly that neither method possesses an effect inherent in itself but is associated inextricably with other factors. These results seem to hinge upon the fact that the trained observers were too analytical and lost their perception of proportion, especially when making slow exploratory movements.

Effect of Size on Symmetry

The trained observers tend to square the smaller figures more than the larger ones. Any extreme diminishes the squaring. Block 3 shows the greatest amount of squaring, which would indicate that block 3 received the combined effects of the trained and untrained. The opposite effects of size upon the two groups of observers would indicate that other and more subtle factors were operating than differences in actual size.

Relation of Squaring to Accuracy of Visual-Tactual Judgments

It may be concluded that those conditions which are conducive to accurate judgments of size are also conducive to squaring. These conditions are not constant throughout the entire investigation nor do they apply equally to both groups of observers. Already it has been shown that the observer himself is an important and neglected factor among the conditions under which the judgments are formed. The different positions, methods, and sizes of blocks cannot be regarded as separate and distinct conditions of judging as such, but only as separate conditions in relation to the observer's procedure.

The relation of the range of judgments of height and width to the actual height and width shows to what extent the figures are broken up and analyzed, especially by the trained observers. The discrepancies between these judgments and actual height and width of the three blocks, 1, 3, and 5 show how the two factors of accuracy and squaring are related. In block 1 the average judged height is 74 percent of actual height, width 94 percent. In block 3 the average height is 120 percent, and width 137 percent. In block 5 the average height is 160 percent, width, 150 percent. In block 3 accuracy and squaring are at their maximum while in block 1 both accuracy and squaring are less. Finally, in block 5 both the accuracy and squaring are still less

in virture of a 50 percent discrepancy in both height and width.

Differences Between Individuals and Groups in Squaring

The tendency toward squaring shows more consistency within individuals than it does between individuals. Like the judgments of size the individuals retained their own consistency under the diferent conditions although the actual amount of squaring was made greater or less owing to a given condition.

The range of all individuals from the least amount of squaring to the most squaring for all positions and for all blocks was 50.6. The greatest range of any individual in any position was 24.7. The least range was 1.9 for a given position. The least average range for the four methods was 4.7 and the greatest was 16.1. The average for all individuals was 10.0

General Differences Between Trained and Naive Observers: Visual Judgments

Throughout the presentation of the results there have appeared differences between the group of trained observers and the untrained group. The apparent differences between these two groups are difficult to describe in quantitative terms. In the following paragraph will be presented the differences between the two groups as shown by the experimental data. No attempt in this section will be made to interpret the differences.

In comparing the two visual forms untrained observers underestimate the standard while the trained observers showed the opposite tendency, that of overestimating the standard. These diverging tendencies were consistent for both height and width.

The trained observers tended to square the visual form more than the untrained observers. In their judgment of tactual standards the untrained observers are more consistent, as shown by higher modes in the curves of distribution. The trained observers give more exaggerated and frequent bimodal distributions.

Differential Effect of Position on Trained and Naive Observers

Table I shows the effect of position upon the two groups of observers. It will be found that the vertical position favors an overestimation of both height and width by the trained observers, while the horizontal position favors overestimation in the untrained observers. The vertical position favors more underestimation of height and width by the trained group of observers although both groups do a great deal of underestimating. In other words, the trained observers do more underestimating in

the horizontal position than do the untrained and the difference is increased in the vertical position. The untrained observers make more judgments toward squaring on both the horizontal and vertical positions. In the former position they are in excess of the trained group to the extent of 71 judgments and in the latter position to the extent of 152 judgments.

Differential Effect of Method on Trained and Naive Observers

The active method of exploration supports approximately twice as much squaring as does the passive method. The untrained group does more squaring in both methods than does the trained group, but the greater excess of squaring occurs under the passive method. This would indicate that the two methods have opposite effects on squaring in the two groups of observers.

Differential Effect of Size of Block Upon Trained and Naive Observers

The series of five blocks as a whole is underestimated much more by the trained subjects than by the untrained. As the blocks become progressively smaller this difference is increased. A similar trend is found between the two groups in the extent of squaring. The trained observers square the blocks less than the untrained and the difference becomes progressively greater as the blocks become smaller.

It would appear as if squaring and the range of distribution in relation to the standard form are closely related. In both the larger block and the smaller block there occurs a greater breadth in the distribution of judgments and also a less amount of squaring, hence it would seem that the extremes of size destroy both accuracy in judgment and at the same time the tendency toward symmetry. Throughout, the untrained observers are more accurate and make their visual figures more symmetrical. *This fact means that accuracy depends upon squaring, i.e., a perception of proportion, rather than upon an analytical judgment of discrete heights and widths.* The trained observers analyzed the tactual object into height and width, reproducing each separately, and therefore were less accurate than the naive observer who perceived the tactual object more as a whole in its proportion and reproduced it as a whole.

QUALITATIVE RESULTS FROM THE JUDGMENTS OF THE BLOCKS

The following are typical unsolicited comments made by observers while sitting for the experiment. "The tactual figure is not

straight." "The apparatus isn't large enough to represent the block visually." "The block has an irregular form." "The angles of the block are not right angles." "The blocks appear to be diamond-shaped." "I cannot make the aperture fit the block."

The following are typical reports from trained observers. "The blocks all seem to be the same size with the exception of the small one." "The bigness is not controlled by the size of the block." "The blocks all seem like squares." "The judgment seems wrong but I can't do anything about it." "The blocks seemed awfully big but suddenly seemed to shrink on me." "The longer I explore it the smaller it becomes." "When comparing the tactual and the visual the tactual shrinks." "When I close my eyes the tactual lengthens." "When I open my eyes and look at the visual aperture, it swells." "The block gets smaller as I put my hand on it." "I don't see how I could possibly have made it so big."

These excerpts show definitely the dearth of criteria with which an observer can make a comparison between a tactually perceived object and a visual one. These criteria depend exclusively upon the fact that the tactual perception is as much visual as it is tactual. No observer could find a single tactual criterion as such enabling him to make his judgment. Hence the discrepancy between the actual sizes of the 2 figures, the tactual and the visual. The subject found it necessary to construct the tactual figure visually without seeing it before he could make a comparison between it and the actual visual figure.

The following conclusions can be drawn from the introspective data:

1) Tactual perceptions of form are distorted through lack of possible criteria of judgment.

2) Tactual perceptions of size lack definiteness for the same reason.

3) Both tactual form and size are recognized by the observers as being unreliable and without criteria.

4) Apparent movement takes place in tactual-visual perception.

APPARENT MOVEMENT BETWEEN TACTUAL AND VISUAL FIGURE

At the close of the sixth or last sitting each of the trained observers was given a test for tactual apparent movement. The procedure for this consisted in presenting block 3 in the horizontal position with the instructions previously given for the active

method. He was told to examine the figure very carefully about the edges and to adjust the diaphragms so that the visual figure matched in size the perception of the block. When this was accomplished he was instructed, further, to fixate the visual figure in the diaphragm carefully and at the same time to place his hand upon the block in the manner of the passive method. After this was done the observer was asked to report how the two sizes of the same figure were reconciled, what the appearance was of the figure in the diaphragm and what the appearance was of the figure under the hand.

Three of 10 observers reported that all changes took place in visual imagery of the hand and of the block under the hand. Two of these 3 reported that the block under the hand appeared to become larger. One reported that he could *feel* the block get larger during the change, but this was a visual-tactual 'feeling.'

Five of the 10 subjects were able to perceive an apparent movement upon the figure in the diaphragm. Also at times some of them would report an enlargement of the visualized block under the hand.

Two of the subjects were able to get no transitional changes in the perceptions of size. They were aware that change in size had occurred but they were not aware of anything until after it had happened.

The following are typical reports of the trained observers. "I visualized my finger movements as I stretched out my hand to place it over the block." "The changes are in the tactual figure visualized in the hand." "A definite visual shrinking took place in the block in my hand. It moved in on all sides at once." "On one side of the visual figure the movement takes place, both as a shortening and as a lengthening of the line. It occurs at the opposite end from that which is fixated. I can produce it on both the vertical and horizontal lines. I must get an actual equality of vividness between the tactual and visual perceptions of the squares before movement will occur." "The movement of the hand appears to correlate perfectly with visual apparent movement. It functions when the visualized perception of the tactual square, or form, flits up to the visual form on the diaphragm. Then the tactual size is perceived in the apparent movement and when the tactual returns the visual form retracts to the visual size." "The change is very rapid and is not always perceived as movement, but merely as a change that has taken place." "While I am fixating the diaphragm I can see the tactual block shrink. It is projected upon the aperture with its sides coinciding with the sides of the aperture. The shrinking takes place upon the aperture." "When the tactual object is again perceived, the visual figure increases in size. It changes

on all sides in a visual outward movement." "When I grasped the block it became larger. It was a visual swelling of the pressure pattern in my hand." "With a passive grasp of the block and by shifting my hand pressure lightly from one side to the other, I can see one side of the visual figure extend in both directions when I fixate the center of the side."

Masses of introspective data like the above may be summarized in the following fashion.

1) Apparent movement may take place on either the tactual or the visual figure as an effort is made to correct a discrepancy between the two perceptions of size.

2) Ordinarily apparent movement involves the shrinking or swelling of the whole figure.

3) With an analytical attitude apparent movement may involve but a single side of the visual figure.

4) Under an analytical attitude the movement may be perceived in a single side, as moving in either direction or as moving in both directions when the side is fixated in the middle.

5) The movement may occur in the form of concrete visual imagery or in highly schematized visual imagery.

6) Under the conditions of this experiment tactual processes as such do not yield apparent movement. The movement is seen, not felt.

7) At no time was an observer, naive or trained, able to describe tactual form or size in other than visual terms.

DISCUSSION

Since it is possible to demonstrate that touch is incapable of supporting spatial perceptions of size and form, it is necessary to harmonize these findings with theoretical views which may account for such flagrant violation of the constancy hypothesis. Were it any longer possible to think in terms of specific sensory functions, the condition which we found in our experiment might be described as visual processes having usurped the perceptual functions carried by touch. Any such explanation as this is quite inadequate to describe the total visual nature of tactual experiences in our subjects.

It is necessary to regard the judgments of our subjects genetically and ask the question if touch has ever been a fac-

tor in the tactual perception of spatial size and form. In the development of the infant, visual perceptions in the case of normal eyesight always precede that of spatial tactual perceptions. In other words, spatial relationships at the very first become differentiated and emerge from a visual ground. The space frame of the normal seeing child is what might be described as a synaesthetic visual space frome out of which spatial relationships must be structured. The extent to which the visual ground may be spatially differentiated has not yet been determined, but it has been found that it is sufficient to support so-called tactual apparent movement which was employed by our subjects in relating discrepancies in tactual-visual space.

The congenitally blind, who have never maturated in a visual direction, possess a kinesthetic ground out of which spatial relationships differentiate. It by necessity carries a much higher subjective or bodily relationship to spatial perceptions than the more objective visual spatial relationships. The extent to which these two spatial grounds are employed in the total spatial perceptions of the normal seeing is as yet undetermined.

The results of this investigation are in agreement with those of Gelb and Goldstein as regards the importance of the visual field for tactual perception.

In general the results are in accord with a *Gestalt* conception of the sensory field which presumes that the field is a functional unit, not an aggregation of discrete modalities. They compel the assumption that the genetically simplest type of consciousness is an organized whole, undifferentiated with respect to quality, and that qualitatively there must be a common ground like the visual or the kinesthetic upon which and partly in terms of which all figures, involving size, position, and form must exist. And finally, they are not in accord with the assumptions of association psychology that the sensory consciousness is composed of parts or elements which blend and fuse *into* a whole. They point to the assumption that the qualitative aspects of sensory consciousness are derived through processes of differentiation that follow organismic rather than mechanistic laws.

CONCLUSIONS

One

Under all our experimental conditions discrepancies occur between the 'tactual' perception of size and the visual perception of the same size.

Two

The discrepancy between 'tactual' and visual perceptions of the

same form occur in all individuals, with the different forms and sizes of standards and under all methods and positions employed in the investigation.

a) Within individuals the extent of the discrepancy may amount to a ±47 percent of the standard.

b) Within a group the average discrepancy may amount to a ±12 percent of the standard.

Three

The extent of the discrepancy occurring between 'tactual' and visual perceptions of the same size is greater for the trained subjects than for the untrained.

a) The difference between the two groups is due to the more analytical attitude of the trained subjects who employed more discrete and isolated criteria in forming their judgments, and attempted to construct a whole from its parts.

Four

The discrepancy between the two perceptions of the same size was greater when the active method was employed than with the passive.

a) The active method of tactual exploration favors a more analytical perception of form by emphasizing the discreteness of height and width.

b) The passive method of exploration favors a tactual perception of the form as a whole in which both height and width are included not as discrete aspects but as a proportion.

Five

The discrepancy between 'tactual' perceptions of size and visual perceptions of the same size is greater when the 'tactual' perception is made with the object in a vertical position than when it is made in a horizontal position.

a) Vertical 'tactual' perceptions are made with less manual facility and dexterity. The perception is less homogeneous and the criteria for making the judgment are less reliable.

Six

Discrepancies between the perception of 'tactual' size and visual perception of the same size are greater when the standards are

extremely large or extremely small.

a) Objects whose size is convenient for manual exploration lend themselves to more accurate perceptions of 'tactual' size.

Seven

Although underestimation and overestimation of both height and width do occur, underestimations of both height and width are the usual type of discrepancy.

Eight

The underestimation of height occurs more often than the under estimation of width.

Nine

In the act of matching a visual form to a tactual rectangle, a figure more closely approaching a square is usually produced.

Ten

In the act of matching a visual form to a visual rectangle, a figure more closely approaching a square is produced.

a) The squaring usually takes place in the direction of underestimating the height and either underestimation of width to a less extent or an overestimation of width.

b) Sometimes the squaring is produced by an overestimation of both height and width in the proper proportion.

Eleven

Similar squaring processes occur in both the visual and 'tactual' perceptions of rectangular form. There is a disposition to perceive the figure squarer than it is.

Twelve

The 'tactual' perception of proportion is the most reliable basis upon which to construct a visual equivalent.

a) Greater inaccuracy occurs when less usable criteria are employed.

Thirteen

The 'tactual' perception of *size* and *form* is exclusively a visual configuration.

Fourteen

No truly tactual patterns were found in the 'tactual' perceptions of form.

Fifteen

a) The perceptions of 'tactual' form were carried in visual imagery.

b) Tactual qualities provide 'texture,' 'body,' and subjective reference but form, extent, position, and organization are visual.

Sixteen

Apparent movement occurs when the discrepancy between the 'tactual' and visual perceptions is noted. Then the movement seemingly occurs in the line of least action as a process of equilibration whereby one of the perceptions is corrected to the other. This does not, however, eliminate the error.

Seventeen

Apparent movement, under these conditions, is a visual adjustment made to two visual extents previously perceived in an erroneous fashion as equal.

Eighteen

This apparent movement differs in kind with different observers.

a) Concrete apparent movement occurs in those individuals who perceive movement in their concrete visual imagery. Schematic apparent movement occurs in those individuals who are able to perceive the movement as divorced both from concrete objects and from the body.

Nineteen

Apparent movement in its various forms and varieties is always visual under the conditions of our experiment.

Twenty

The exclusively visual nature of apparent movement confirms the fact that 'tactual' patterns do not, as such, exist.

Twenty-One

The continuity and uniformity of experience, as revealed in this

investigation, necessitate the field concept of sensation in which one sensory organization serves for all modalities.

Twenty-Two

Throughout our investigation no evidence could be found that a sensory configuration of homogeneous quality (tactual) was organized upon the ground of another and different sensory quality.

Twenty-Three

Visual imagery furnishes continuity between otherwise discrete tactual features of complex 'tactual' perceptions, such as varying intensities and qualities at different places on the skin.

a) Visual imagery furnishes continuity between tactual figure and conscious ground. The ground of 'tactual' perception is visual.

Twenty-Four

The tactual experiences of our observers reveal, without exception, the phenomenon of synaesthesia.

Twenty-Five

Within the limits of our investigation 'tactual' perceptions are always visual-tactual. It is evident that in the genetic development of these perceptions in seeing individuals maturation and specialization take place in visual processes, not in tactual. That is, the form, localization, extent, movement, and qualitative differentiation found in so-called 'tactual' perceptions are fundamentally visual.

a) This fact is consistent with the modern trend in psychology to dispense with a systematic differentiation between visual sensation and visual imagery.

Twenty-Six

From the results of this experiment it is necessary to conclude that the tactual field does not function in seeing individuals separately from the visual. The two modalities are not and cannot be distinct for the purposes of perception. It is an error to speak of a pure tactual or tactual-motor perception.

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BLINDNESS AS AN ADEQUATE EXPRESSION OF ANXIETY

It is becoming a generally accepted psychiatric concept that all of us human beings are potential candidates for a neurotic condition. Whenever our environmental situation does not provide us with the satisfactions that our emotional patterns demand, we are compelled to meet life in an unrealistic manner through the use of what are known as anxiety symptoms. These symptoms develop when our demands cannot be realized in the objective world and are transposed into subjective problems. This is what has happened to the hypochondriac and the alcoholic.

In relation to our problem, there is an aspect of the origin of the symptoms which is of great interest to us. This is that every symptom, apparently without exception, develops out of the emotional perception of the individual's inadequacies. The hypochondriac defines his anxiety in terms of his lack of confidence in his own physical health. Another characteristic of these symptoms which is interesting to us is that they occur singly and not in pairs or groups. In other words, the hypochondriac needs but one imaginary illness to meet his frustrations. The shell-shocked soldier needs but one symptom to get him out of the trenches.

From a psychiatric point of view, it would appear as if this human mechanism would raise a very interesting problem relative to the emotional life of the blind and the personality adjustment that they are called upon to make in relation to their world. It is generally conceded that the blind do have a considerable amount of emotional difficulty in making their adjustments, and that they do encounter a great many more forms of frustration than the average seeing person. If this is the case, we would expect to find a large amount of psychopathology plainly exhibiting itself in the personality behavior of the blind. Even though we do find more than we wish existed, still the amount of apparent emotional disturbance is not at all in proportion to what we believe actually should appear due to the circumstances under which blind persons live. Apparently there are but two logical answers to this question: either we are fooling ourselves about the amount of frustration and thwarting in the life of the blind; or else they are using some form of pathological symptoms which have been escaping us.

In the light of recent psychiatric investigation in other fields, we are justified in the strong suspicion that the condition of blindness which produces a frustrated life also furnishes its own major pathological symptom.

In order properly to evaluate this concept, it might be illuminating for those of us who have had many years of association with large numbers of blind persons to count on our fingers the number of cases we have observed of peptic ulcers, hypertensive heart and circulatory disturbances, various hysterical paralyses, anaesthesias, and conditions involving vasomotor instability among blind persons.

It is unfortunate that we do not have medical figures on the frequency rate of functional disturbances occurring among the blind. Among the seeing, they occur in about 30 percent of the population and are employed by them to meet the difficulties in their lives. All of us have a great many seeing friends and acquaintances who are constantly wrestling with nervous bowels, exaggerated food allergies, nervous hearts, and phobias for this and that. But do we in our long list of blind acquaintances find anywhere near such a high proportion of nervous disorders?

Until quite recently, the medical world regarded it as an interesting and unexplainable phenomenon that tubercular patients were apparently much happier and much better adjusted emotionally than the seriousness of their condition should warrant. Sufficient psychiatric investigation into the emotional adjustment of the tubercular patient has been made to indicate that the older medical concept was superficial and far from the truth. It has been found that the tubercular invalid, beneath his objective behavior, was living a life of deep anxiety, apprehension, frustration, and desperation. It is obvious that an equal degree of these emotional disturbances would produce a variety of stubborn symptoms in a physically healthy person, but since a tubercular patient, as soon as his malady is recognized, is forced into a condition of invalidism it becomes possible for the patient to meet all his problems successfully flat on his back. The state of invalidism itself is a sufficient escape from all real worries, and the patient can meet his objective world pleasantly and cheerfully.

It requires no imagination at all to apply the personality pattern which the tubercular patient immediately learned to the situation in which the average blind person finds himself. In the case of both the congenital blind and those who have lost their sight after a period of good vision, the world and their personal responsibilities from the point of view of the average seeing person are overwhelmingly too dangerous to meet. The two cases of blindness are greatly similar, with the exception that the congenitally blind child has an oppor-

tunity to incorporate his symptom with his total self-regarding attitude from birth, with the result that he never learns that he is meeting his problems in a hysterical fashion. From the standpoint of psychiatric prognosis it is almost necessary to regard him as utterly incurable.

The therapeutic outlook for the adventitiously blind, who previous to their blinding had a healthy attitude toward themselves, is much more optimistic, for a great deal can be done to reinterpret the new dangers of both their physical and their social world to them. When this is accomplished, we find them employing their blindness less and less as a mechanism of conversion hysteria. The objective world becomes more real, interesting, and manageable, while their subjective world diminishes in egocentric importance.

It is in relation to this process of personality rehabilitation of the blind that we approach the second phase of this problem. Perhaps this is a question that only a fool would ask: But is it not conceivable that we might possibly rehabilitate a blind person to the point where not only his objective happiness but also his health might be jeopardized? Let us suppose we have an individual who lost his vision during some convenient period, say early adolescence, and that we were able to prevent him from fully escaping into his new condition, and to repair a large amount of the damage to his ego by the time he became an adult. This would mean that he regarded his condition of blindness as about the most uninteresting and unimportant thing about himself. He would assume all the responsibilities of the normal adult and set about to achieve his goals and live his life as an ordinary individual. Undoubtedly, due to his handicap, which he has learned to ignore instead of employ as a shield, he would find the going extremely difficult and, naturally, he would build up a set of normal anxieties regarding the objective world which he had adopted with the result that he would either be unhappy over his limited achievement or develop anxiety symptoms characteristic of his seeing associates, or develop a condition of hypertension in maintaining the extra effort his task required.

Again perhaps it would be well for those of us who have had long years of association with the blind to review our acquaintances and judge if this is not the situation of those who are troubled with anxiety symptoms and the organic consequences of functional disturbances. In these cases the psychiatric picture develops not from blindness, but rather from the consequences of renouncing it as a hysterical crutch through life.

It is gratifying to one who is personally interested in both the blind and in personality work to observe that an in-

creasing amount of attention is being given to the problem of emotional adjustment of the blind in our educational institutions and vocational and adult agencies. However, it is quite important for those who are so interested to recognize the difficulties that are inherent in the problem with which they struggle. Even in spite of the very best that the best of us can do, the conclusion is obvious that there is no such thing as a healthy adjustment for the blind. Instead, there are two main types of maladjustment: One furnishes an egocentric state of security for the blind individual; the other furnishes pride and satisfaction to Society and their personality workers and a more active and useful life for the blind.

PERSONALITY AND SOCIAL ADJUSTMENT AMONG THE BLIND

The personality problem of the blind is in many ways comparable with that of the redhead of half a century ago. Within the memory of many of us the redhead, that unfortunate hybrid between the blond and the brunette, was born into a world where his personality characteristics were already typed and fixed for him. Popular attitudes assumed that the child naturally would be emotionally unstable, fiery tempered, strong willed, inconsistent and undoubtedly oversexed. The parents who also shared these attitudes reacted to the child accordingly. They compensated either defensively or aggressively, trying to be sure that the child should show none of these expected characteristics of personality. The effects upon the child were about the same whichever type of compensation the parents exercised.

In recent years popular attitudes toward redheads have modified and relaxed to the extent that these individuals are considered not only beautiful, but also almost normal and frequently even quite stable. This shift in social attitude was accomplished not by the learned works of sociologists and psychologists, nor even by the outraged protests of the redheads themselves, but by the ingenuity of stylists and cosmeticians.

Even now, however, the clinical psychologist still sees individuals bearing the personality scars of a carrot-top childhood. The damage has been done not only to the self-regarding attitudes, but to the social reaction pattern as well. It is an inescapable observation that while the personality pattern of the socially damaged redhead is consistent with the attitudes of a generation ago, it is also consistent with the personality pattern of most socially frustrated persons. In other words, society, with its preconceived attitudes, can induce the neurotic personalities it feels to be inherent in particular groups.

The blind person, like the readhead of yesterday, has both a personality problem and a social problem. The interrelations of cause and effect, however intricate and complex, that have produced these problems are in the province of the same social psychology that applies to all of us. To postulate a special psychology of the blind is only to confuse rather than to clarify the issue.

It is the purpose of this chapter to describe and discuss

specifically the personality factors that the condition of blindness induces when an individual so affected attempts to live in a social world unaccustomed to the condition of blindness. Any discussion of the personality difficulties and social maladjustment of the blind, within the brief limits of this chapter, will appear too generalized and will suffer much from oversimplification. Many extraneous factors add complexities which too often are not carefully enough differentiated from blindness itself. Thus, even a slight mental defect, or some less conspicuous physical defect, can become a causal factor in personality difficulties which will not be recognized as distinct from the more obvious physical defect.

Furthermore, blindness is a physical condition that may occur at any time in the life of an individual. If it occurs early in life, it is likely to produce its own particular effect upon the personality which has not yet become fully established. If it occurs at a later age, it will tend to rearrange the self-regarding attitudes and social reaction patterns which already have been established in the more mature individual. Since blindness is a physical condition it may occur alone, or it may occur as one of a group of physical disorders and complications. The condition of the congenital luetic blind child is an example of the complexity which may be found in the young, while blindness resulting from hypertension is a common occurrence in more advanced years. In cases where blindness is one component of a complex syndrome it can be expected that the total personality will be affected a great deal more by the general systemic effect of the disease than by the isolated factor of blindness. More specifically, the effect that congenital syphilis has upon the mentality of the individual is a much greater factor than his blindness. Likewise, in the case of hypertension, when the disease has advanced to the point where it can effect vision, it is very likely that cerebral damage from sclerosis far outweighs any visual defect.

It is true that blindness makes life more difficult, but blindness alone cannot explain the amount of disability, physical, social, and economic, that is found among the blind. Marriage and parenthood also make life more difficult, physically, socially, and economically, and indeed some immature individuals are incapacitated by the introduction of these radical changes into their lives.

Without further discussion, the rather dogmatic conclusion must be stated that the disability and incapacitation so commonly found among the blind have their origin not in the physical condition, but in the impact of the individual upon society and its attitudes.

The blind child or adult does not live long in his social world without accepting, in greater or less degree, the attitudes

of others toward him. In the case of the child, these attitudes are mostly acquired after sight has been lost. In the case of the adult, the attitudes already have been acquired in large part prior to the loss of sight. They are his own social attitudes inflicted upon himself - the attitudes he has previously expressed towards others in a similar condition. Hence, in both cases, the effects are deep rooted and extremely persistent.

Regardless of whether these attitudes are the result of accretion from society, or whether they are self-inflicted, they have the same result. The individual soon feels himself separate and apart from the group. This feeling of insecurity lays the groundwork for a complex pattern of self-regarding attitudes of social inadequacy, a pattern which is increased in width and depth by the individual's attempts to establish security and identity with the group.

There are two reaction patterns of establishing ego-importance in the group and regaining a feeling of security and self-assurance. The first is the pattern of compensation. In following this pattern, the individual attempts to prove to himself and to the group that the inadequacy does not exist. He develops along the line of the compulsive personality. The second pattern is that of retreat, wherein the individual accepts his feelings of inadequacy as a valid evaluation of his ego-importance and establishes a false security by failing to meet life aggressively. He develops hysterical responses which only add conviction to his feelings of inadequacy.

It is impossible to classify blind individuals categorically in either one of these personality groups. While one pattern will dominate in a given personality structure, both tendencies will be in operation. It is this dual pattern which makes the blind individual apparently so erratic, inconsistent, and difficult. His social world tends to approve, develop, and exploit his compulsive compensations, and at the same time to deplore and be baffled by his hysterical responses. It is obvious that any therapeutic program for the adjustment of the blind personality that concerns itself only with the correction of either or both of these personality malformations is doomed to failure.

Therapeutic or educational emphasis upon compulsive symptoms leads in the dangerous direction of creating lopsided personalities, monstrosities or geniuses as the case may be. It is work in this direction that produces the accomplished blind vocalist who is incapable of shining his own shoes or emptying the kitchen garbage can. It is work in this direction that produces the brilliant student whose personality would render him incapable of even giving away papers at a news stand. It is work in this direction that can create a master in domestic arts whose personal manner and appearance would stop a clock.

Aside from failing in its social purpose, the overdevelopment of compensatory aptitudes achieves little for the stability and emotional security of the blind individual himself. It is as though the psychotherapist were to urge the broken-down financier to cure himself by going out and making another million. In spite of the approval that educators and social agencies place upon these compulsive manifestations, and in spite of their tendency to foster and exploit them whenever possible, compensations are as much evidence of personality pathology as the less approved and more baffling hysterical reactions.

The second pattern, the hysterical tendency to be dependent, to seek protection, to withdraw into blindness, is only another attempt to achieve ego-importance, this time by the regressive route. Such hysterical phenomena are well recognized and much discussed by those who have lived and worked with the blind, and in the minds of many they constitute, in themselves, the material of a psychology of the blind. In spite of their familiarity the underlying causes of this type of behavior seem not to be too well understood.

In order not to confuse the fundamental causes of personality maladjustment with the source of specific frustration, it might be well to review briefly the emotional mechanism which causes any frustrated individual either to withdraw from his environment or to attack it unintelligently. Since the thesis of this chapter centers about the reactions of the socially frustrated personality, the explanatory principle to be employed must be clearly understood. However, since translating a dynamic process into an abstract concept is very close to an impossibility, perhaps an illustration from a simple situational neurosis will serve as clarification.

An attractive, intelligent, capable young business woman is married to an aggressive, self-sufficient, lordly male. The husband admires his wife's feminine charm and beauty and her pleasing personality, but to him all women are congenitally scatter-brained, temperamental, and lacking in sound judgment. The wife, on the other hand, has taken her femininity for granted since childhood, and has found her ego-importance in her intelligence and judgment. Her husband, because of his own attitudes is unable to take her at her own evaluation. No matter how hard she tries to demonstrate what she considers her true worth, she feels defeated and rejected. Because she loves her husband, she is unable to feel the wrath and fury that could function as a release for her feeling of frustration. Unresolved tension mounts. Her emotional responses become heightened. Her mind is filled with worry and anxiety. She loses interest in her home and friends, and even begins to lose confidence in her intelligence because she is unable to concentrate. At last she becomes aware of some peculiar and frightening performances of her heart, and her frustration is over. She no longer has to find her importance to her

husband because of her intelligence and ability. She has found that importance as a cardiac invalid. Her newly found importance, however, is not that of a mature adult. She has reestablished the infantile relationship of child to parent.

There is nothing mystical, unnatural, or indecent about a neurosis. Such a condition is the result of the very best effects of an individual to gain recognition and approval on his level of emotional maturity, with his degree of insight into the social relationships involved. In order to make use of the illustration given above, it is necessary to appreciate four important factors always found in any neurotic condition. First, the individual fails to establish himself in his social relationships at his own self-evaluation. Second, he meets the situation with inadequate emotional response: that is, he fails to feel the natural, normal irritations, resentments, and furies produced by failure of accomplishment. Third, he makes an unconscious attempt to resolve the tensions from anger by withdrawing from the objective world and concentrating attention, interest, and concern upon the subjective realm. Fourth, he employs a substitute problem which gives a false feeling of assurance and importance.

It is not necessary to discuss even briefly the first step of this process, for nearly all the literature on the blind is concerned with it, and all the social attitudes make this situation inevitable. However, it is necessary to point out the fact that the self-regarding attitudes of the blind are just as important in creating the conflict as are the attitudes found in others regarding them.

Perhaps the least understood and appreciated aspect of the neurosis involved in blindness centers about the reaction pattern produced by inadequate emotional response. It is a characteristic biosocial emotional mechanism, common to animal and man alike, that in an attempt to establish ego-importance, approval, and security, docility and compliance are resorted to. The domestication and training of animals make use of this neurotic mechanism. It is accomplished by submerging aggressive resentment towards others and substituting anxiety in their attitudes towards us.

Many of the blind live in the same social world as does my spaniel. If you must be a dog, at least you can be a nice dog. He is. His ego demands my affection and approval. And he sacrifices his aggressiveness, his normal temper and pugnacity to attain it. With strangers, he is not neurotic. He is a healthy, aggressive, self-assured dog.

It is a well-established clinical concept that unresolved tension becomes egocentrically directed. This direction is found in every frustrated personality. It is a growth process which, if long continued, causes the individual to regard his

subjective life as more important than his objective world. Manifestations of this mechanism are common among the blind in the form of daydreaming, fidgeting habits, and various automatisms. It has been the general feeling that somehow these apparently meaningless activities are inherent in the state of blindness. Seldom have they been regarded as an inevitable and inescapable phase of a neurosis.

The blind, unlike the majority of frustrated personalities, do not have to wait until the autonomic nervous system furnishes them with a spasm which can be used as a conversion symptom. They, like the infantile paralytics, have an avenue of escape already prepared.

Elaborating the processes briefly outlined above is a delicate task. It is always difficult to discuss candidly any social problem that is close to the hearts of those involved without appearing ruthless and unsympathetic. The whole problem of the social situation of the blind individual, in which he finds himself a frustrated member of his group, like all social problems, is complex and confusing to all those involved. It is necessary to accept the fact that contributing causes are found both among the blind and among the seeing which prevent each group from a mutual acceptance and understanding of the other.

Until recently the blind and those interested in them have insisted that society revise and modify its attitude toward this specific group. Obviously, for many reasons this is an impossibility, and effort spent on such a program is as futile as spitting into the wind. In the first place, society has formulated its emotional attitudes not towards blindness itself, but towards the reaction pattern of the blind towards themselves and their own condition. Second, it is extremely doubtful whether the degree of emotional maturity and social adaptability of the blind would long support and sustain any social change of attitude, if it were possible to achieve it.

To state an analogous example, nearly every individual in the United States knows intimately some neurotic personality within his own family or neighborhood and rationally understands the broader aspects of the condition. Aside from his own personal observation, he has collected a fair amount of enlightenment about the neurotic personality from lectures, newspapers, and magazines. However, in spite of information and observation, the general attitude towards the partially or totally incapacitated neurotic personality remains the same. He is a weak-willed, "yellow," perverse, lacking decision and determination, and difficult to get along with. And besides, he is a bit "touched." The knowledge about the neurotic and the attitude toward him are completely inconsistent. The behavior of the frustrated personality, far from inviting an enlightened attitude and an understanding approach,

usually only adds emotional conviction to a set of preconceived notions.

A further confusion of attitude is found in educators and workers for the blind who try to propagandize society with the rational concept that the blind are normal individuals without vision. This desperate whistling in the dark does more damage than good. The blind perceive it as a hypocritical distortion of their true state, and society discovers it to be a misrepresentation of actual facts.

If there is to be any solution of the pattern of frustration, the responsibility for that solution must be assumed by the blind individual himself, as an individual, and not as a member of a group. He must mature to accept himself as he is and to live in his social world as it is. Many individuals have found this pattern for themselves, and when they have found it, they have made the joyous discovery that the condition of blindness is the least important thing about themselves, and that it is of no importance at all to others. Then, and only then, can they set about the task of living objectively.

Among all the neurotic manifestations that have been discussed, the inadequate emotional response of the blind is no doubt the greatest factor in their debilitation. The emotional acceptance of any feeling of inadequacy, either real or imaginary, is a preparatory step toward rendering the individual dependent upon those from whom he seeks approval and acceptance. The individual who meets his social world with the ego-demand that he be accepted and given recognition in spite of this, or because of that, becomes a passive recipient rather than an aggressive giver in his social relationships. As has been stated above, this comes about by the conversion of aggressive emotional responses toward the objective world into subjective anxieties regarding security.

This subtle mechanism acts as a two-edged sword in the life of the neurotic. He dare not assume the responsibility of aggressive action, and galls under passive acceptance. The blind, like other frustrated personalities, trade the birthright of self-assurance that goes with aggressive action, the courage that goes with anger, and the audacity that goes with rage for ineffectual action, compliant passivity, and the self-contempt of a dependent.

The egocentric swing of attention and interest that always results from inadequate emotional response takes a variety of forms. Perhaps the most serious and crippling effect of the withdrawal from objectivity and the concentration upon subjectivity is the rigidity that is produced in the personality. This mechanism presents the same problem to the teacher and worker for

the blind as it does to the clinical psychologist. This rigidity renders the individual incapable of meeting situations except in terms of his own self-evaluation. In compensatory manifestations in the self-regarding attitude, the individual cannot meet a new situation because of his superiority; "I am too proud, too smart, too decent." In the hysterical manifestation of the same mechanism, the rigidity takes the form of reticence; "I am to sensitive, too inexperienced, too weak, too timid." In the educational and vocational activities of the blind, this rigidity is a more serious disability than among the seeing for, because of the physical limitations, the individual has less choice of alternative action. Many times the condition of blindness itself is blamed for the incapacitation resulting from this very common neurotic trait.

When, in the case of personality conflict, unresolved tensions heighten the physical, emotional, and mental awareness of the self, it is not to be expected that these responses to the self will go on without objective expression. The so-called "blindisms" which comprise a large variety of socially objectionable habits are only the responses of the individual reacting to his own physical awareness, in an attempt to resolve the tension and gain the satisfaction denied by his nonagressiveness. Blindness is no more the cause of this automatism than vision is the cause of nail biting, thumb sucking, and autoerotic manifestations in the equally neurotic, seeing child. Likewise, daydreams and fantasies are an expression of the heightened emotionality resulting from conflict. They mesh with reality quite as well as the daydreams and fantasies which the clinical psychologist encounters in frustrated seeing persons.

It has long been an accepted concept in psychiatry that the strain of a personality in conflict within itself will either bring about an objective adjustment, or sooner or later find some means of resolving the conflict, the new form being known as a conversion mechanism. Conversion mechanisms may take many and varied forms, each with its own degree of incapacitation. Conversion symptoms can be either real or imaginary, but when real they are exaggerated far beyond their intrinsic importance. Some of them are periodic, appearing when strain and conflict become critical, disappearing when the crisis has passed. Apparently there is a tendency to employ any specific chronic state or condition as a conversion symptom when one is needed. Since this pattern is a common human reaction, we cannot demand that the blind be a solitary exception. To those who are acquainted with both the blind and the neurotic personality, it is unnecessary to elaborate the possibilities that blindness offers, and to those who are not so acquainted it would be futile.

If any accurate clinical survey could be made of the escapes and conversions employed by the blind, undoubtedly the following results would be found. Among those individuals who were employing their physical condition as a successful escape and retreat from reality and objectivity, there would be a marked absence of

other forms of symptoms. On the other hand, among those individuals who were more successfully meeting their objective world, we would expect to find a number of lesser escape mechanisms, and among those individuals who were most successful and who were assuming the responsibility for their own adjustment and social relationships, we would expect to find a high frequency of the same sort of psychosomatic disturbances that are found in the neurotic population of the seeing. Teachers and workers for the blind might employ this clinical concept as an index to the emotional health of their pupils and clients. Those who show psychosomatic disturbances such as nervous indigestion, migraine headache, cardiac symptoms, and the like, might be regarded as emotionally more mature, educable, and adaptable than the less nervous who have ceased any attempt to meet the world except on the basis of their major conversion.

It is conventional to discuss the adjustment of personality under the headings of social adjustment, vocational adjustment, and marital or social sex adjustment. Since the entire theme of this chapter centers about the social maladjustment of the blind as it contributes to the personality, only a brief paragraph need be devoted to the specific discussion of social adjustment before passing on to the problems of vocational and sex adjustment.

Aside from showing numerous petty neurotic idiosyncrasies, their personality pattern forces the blind to be cheerfully compliant and agreeable. There is an exception to this picture in the more close and intimate social relationships, in which the neurotic personality achieves a greater feeling of assurance by establishing an aggressive control and domination of these relationships in the name of his symptoms. Parents, teachers, and workers are quite familiar with this pattern.

By both subtle and direct means the blind resist increasing their social relationships and responsibilities. Because of this tendency, social agencies make use of the practice of congregating the blind together for the purpose of socialization. Growth toward maturity can never take place in a concentration of social inadequacies. It leads rather to a deepening of the feeling of inadequacy and a heightened dependence upon the inadequate group, an emotional rejection of those who are different, and an increasing fear of the loss of security and acceptance.

The scope of this chapter permits only a discussion of vocational adjustment as it is related to personality factors. Here again, the problem is not one of the blind alone, but is one for the educators of the seeing as well. A highly respected western technical school based its selection of students on scholastic achievement, scientific promise, and technical ability. After a few years of training these technical boy geniuses into brilliant

engineers it was found that many of them failed to become successful vocationally due to social maladjustment. It is indeed an educational extravagance to equip a brilliant student with the best of technical training, only to have his personality restrict him to running a laundry truck. This school met the problem in accordance with what is now considered good educational practice, by expanding its basis of selection to include an evaluation of the applicant's social fitness.

Vocational training agencies for the blind have the opportunity of no such latitude of choice. Their material is selected for them purely on the basis of blindness, which is only too likely to carry with it the more debilitating factor of a maladjusted personality.

No doubt it is an idle bit of curiosity which causes one to wonder if perchance the conventional vocational handicrafts taught to the blind were not unconsciously selected more to suit the personality of the ego-centric social hermit than for their suitability to the lack of vision. It appears that the individual who could master all the complex intricate processes of the weaving craft would also have the ability to establish himself successfully in a much less solitary vocation, with greater social responsibility and greater earning power. Likewise, the lone-wolf piano tuner who is so perceptive that he can grasp all the intricate relationships of counterpoint should be able to attune himself to intricate and complex social relationships so that he could have as salesworthy a personality as a Fuller Brush man. We all know individuals who have escaped the trap of blind vocational guidance who, with very likely less intelligence than the average product of vocational guidance, are conducting their own independent enterprises successfully.

Without further elaboration, it is evident that something is lacking in the whole concept of the vocational adjustment of the blind. It is dodging the issue to place the responsibility on the unbelieving and nonreceptive popular attitudes. It is dodging the issue to place the responsibility on the limitations caused by the lack of sight. The only true answer lies in the unfortunate circumstance that the blind share with other neurotics the nonaggressive personality and the inability to participate fully in society.

When assisting any emotionally dependent personality, it is always a delicate question just how much the therapeutic agent should spearhead aggressive activity. Usually, social agencies err on the side of assuming too much of the responsibility that should be taken by the client. Too often this is necessary, even against the better judgment of the agency, in order to get more results faster. The poor therapeutic result of such a tendency is to force the client into a vocational situation for

which he is not emotionally prepared instead of permitting him to grow into the situation by feeling his way more gradually. As a rule, those blind individuals who are most successful are those who have not been directed by social agencies, and who mature emotionally as they advance vocationally.

It is a common observation of vocational workers for the blind that the greatest problems in vocational adjustment are found in the individuals who have received their education in institutions for the blind. There are two explanations for this situation, each of which contributes its share. No doubt the parental type of supervision practiced in an institution, as well as the lack of opportunity to develop aggressive social attitudes contributes much. It is also true that those who have attended educational institutions for the blind have lost their sight at an earlier age and have been developing much longer in the direction of emotional incapacitation than those who lose their sight after attaining maturity.

An unhealthy parental attitude of vocational agents for the blind reveals itself in the type of publicity that is put out regarding the successes and achievements of their clients. Too often it is difficult to distinguish whether they are attempting to acquaint the public with the vocational potentials of the blind, or whether they are describing their own ability to achieve the impossible. Whatever effect this has on the public, it is not too encouraging to the blind. Far too much space is given in newspapers, and far too much time over the air, triumphantly describing trifles which should be taken for granted by both the blind and their agencies. It is nice to know that Mary Smith has held a job on an assembly line, putting in place accurately and rapidly two nuts and three washers, although Mrs. Jones has been using electric mixers, pressure cookers, gas ranges, and electric washers for years. It is nice to know that Bill Johnson has been promoted to the drill press and jig, even though Dick Robinson has been overhauling his own automobile engine for the past fifteen years. If anything is going to keep the public impressed with the incapacitation of the blind, a lot of this ecstatic propaganda will do it. It has been a personal observation that a lusty, rough and tumble brawl in a logging camp bunk house will produce more vocational opportunity than the best vocational agency, and that an evening spent in a vicious game of poker with professional associates is of more professional value than writing scientific books and articles.

Social sex maturity, at its best, is but a compromise between the biological sex drive and the social environment, and the individual's concept of himself always is the most important part of that social environment. Before discussing specially the social sex development among the blind, it is well to be aware of the pattern of social sex maturity found among frustrated personalities who have sight. Thus it may be possible not to confuse cau-

sal factors.

In any consideration of sex pathology in individuals or in groups, it is important to avoid the concept that sex pathology is the cause of the damaged personality, or its reverse, that the damaged personality produces the sex immaturity. Both are parts of the same ego-social structure, each having the same set of causes, each representing an equal inability to make satisfactory adult adjustments.

It is extremely rare that the clinical psychologist fails to find evidences of sex immaturity in any individual who has failed to make an adequate, satisfactory adjustment to life. Among those who find mature subjective sex incompatible with their self-regarding attitudes, sex immaturities occur in the form of autoeroticism, frigidity, impotence, marital instability, and homosexuality. These are the major forms of the renunciation of sex maturity, and there are numerous variations and gradations.

The blind and seeing both have the same objective social environment. Both are forced to integrate within their personalities the same set of social attitudes toward sex. These conventional attitudes have been degraded to such an extent that they are scarcely compatible with anyone's self-acceptance. They have been degraded by the religious concept of original sin, wherein the institution of marriage is but a permit to sin, and offspring come into the world contaminated by conception. Socially, sex is unthinkable and unspeakable. Aesthetically, it is vulgar, repulsive, and vile. Ethically, it is wrong and bad. Physically, it is harmful and injurious. Conversationally, it provides the framework for a crude joke. The blind and the seeing alike have the task of integrating all this negative social feeling in order to attain whatever social sex maturity they can. The clinical psychologist is only too well aware of how often marriage fails to be a catalytic agent in the process.

Since social sex maturity has as its goal marriage, which includes the social and economic responsibility of a home, a mate, and a family, we must not be surprised to find, logically as well as clinically, that there does occur a great deal more deviation and recoil from maturity in social sex development among the blind than among the seeing. Aside from the general personality pathology of the blind, there are numerous situations and factors that contribute to their specific sexual immaturity.

In the case of young blind children, the emotional closeness of parent and child are likely to produce damaging incestuous emotional conflicts. Under the close parental supervision that the average blind child receives, condemnation for autoerotic manifestations also produces damaging emotional conflicts.

In educational institutions for the blind, where segregation

is practiced, children of both sexes suffer from lack of social sex stimulation normal to their age. This prolongs the more infantile autoerotic response pattern and is likely to introduce social sex stimulation in the direction of homosexuality.

In the educational institutions which permit intermingling of the sexes, a severe retardation of social sex maturity also occurs. The advantages of such a heterosexual social stimulus as this situation offers are canceled by the social condemnation and fear of intermarriage. This condemnation and fear permit only a partial acceptance of the social sex stimulus, and the emotional rejection of the responses toward that stimulus. Cases have been found where this sort of conflict persisted and retarded social sex maturity for years after the particular situation had been left behind.

Another practice highly detrimental to normal social adjustment of both men and women, old and young, is that of congregating the blind together in social, recreational, and vocational groups. The condemnation of intermarriage hangs over such a group, furnishing about the same self-approval and acceptance one of the other as is found in an incest anxiety. Such parctices not only provide mutually damaging social sex stimulation, but also interfere with the opportunity of growing toward normal social stimulation.

The marital and social sex adjustment of the blind can be summed up in the following picture. Once more, we find the socially frustrated personality, maneuvering himself upon the irresponsible end of every social sex situation, an eager guilty recipient rather than an aggressive happy giver. In his social sex attitudes he is prone to demand much but contribute little. He feels more concern about the affection of the other toward him than he feels satisfaction in his deep affection toward the other. Like the homosexual and the Lesbian, he strives for sex fulfilment, but flinches from the emotional and social responsibilities that go with it.

It is far easier to present and discuss problems in social pathology than it is to offer constructive suggestions for their therapy. The more that is learned regarding the structure of the human personality, the more clearly it is recognized that there can be no quick, simple, direct recipe for correction. Personality structure is the result of a growth process, dependent upon whatever stimulus is available and upon whatever level of maturity has been reached.

In order to accomplish anything it is necessary to bring influence to bear upon both the individual and his social world. There are two general directions for attacking such a problem, either to adjust the individual to his environment or to rearrange the environment so that it ceases to be a difficulty to the individual. It is quite obvious that the latter program is not only

inadvisable, but also impossible. However, it is the attack that nearly every frustrated, maladjusted person futilely attempts.

The other alternative is to adjust the individual to his environment as it is. This process can be divided into two major therapeutic programs; first, to redefine the self-regarding attitude of the individual himself; second, to redefine the environmental situation to the individual in terms of the former revised definition of the self. With this sort of clinical and therapeutic picture, it becomes obvious that most of the responsibility for readjustment falls upon the individual himself.

If we are to assist in this process, then we must revise our whole concept of the disability involved in blindness. As early as possible, when such a condition is encountered in an individual, young or old, he should be acquainted with the true nature of his disability; namely, that his self-regarding attitudes are a greater incapacitation to him than the physical restrictions imposed by blindness. He should be taught that his major task is not that of conquering the world, but that it is one perhaps equally as great. It is the task of perceiving and refusing to employ as tools his feelings of inadequacy, insecurity, and lack of self-assurance.

Such a therapeutic program would require a drastic revision in the attitudes of the families, schools, and workers for the blind who insist on making the blind person a functioning team mate by calling the signals, carrying the ball, and running interference. Emotionally, he is in the game, but not of it. And no one is more keenly aware of the fact than he himself.

Also as early as possible, the blind individual should be taught to assume full emotional responsibility for his physical condition, and should become aware of and refuse to employ his physical condition as either a negative or a positive factor in his social relations. When this responsibility has been assumed, the myriads of temptations to use his ever ready symptom in his social relationships become immediately apparent.

The very young blind present a difficult therapeutic problem, for they have neither the intellectual maturity to receive such insight, nor the environmental situation that will offer them the opportunity of assuming their own emotional responsibility. The home situation for the blind child has long been recognized as almost a hopeless social environment. Professional nursery homes for the blind child have therapeutic possibilities, but it is doubtful whether these possibilities are exploited fully as yet.

In spite of the excellent academic and vocational training that our educational schools for the blind offer, they cannot help but be regarded as therapeutically extremely unhygienic. Blind children should not be thrown together any more than should

juvenile delinquents. Personality maturities seldom rub off. However, personality immaturities are notorious for their contagion. The education of blind children should by all means be among the seeing, and that does not mean among the seeing mental defective, spastic paralytic, and epileptic, which too often passes as public school education for the blind.

It would be unduly optimistic, if not fanatical, either to hope or to expect that much personality therapy will be introduced into the present methods of educating, training, and adjusting the blind. Why should it be expected when among the physically fit sighted population can be found approximately 30 percent of the personality structures infested by the same type of emotional termites? For a long time to come, the social economic and social sex problems of the blind will be met by the old platitudinous neurosis builder, moralistic inspirationalism.

ARE WE TRULY PART OF THE COMMUNITY?

I am very happy that your program committee asked me to speak on the topic for this morning's consideration: "Are we Truly Part of the Community?" This searching question is delightful in itself because of the manifold ramifications an adequate answer would require. More than that, it touches the central problem of our lives, our adequacy not as blind people, but as people. The question proposed in the setting of this convention, delights me most of all because it gives evidence of our growing sense of social responsibility and of our growing recognition of the need for realistic self-evaluation.

Let's start with one of the fundamental premises of all social theory, that human personality is a product of social interaction, that only through our human contacts do we develop even the fundamental concept of the self. Beginning with the mother-child relationship and expanding through the family, the neighborhood group, and an ever-widening sphere of social contact with persons and with groups. We eventually achieve our definition of ourselves and our social environment. To put it simply, man is a gregarious animal and social contact is as necessary to him as the air he breathes and the food that nourishes him. From this comes the need to belong, the desire to be accepted or to be distinguished in the group, along with the fundamental definitions already mentioned. And we have no reason to believe that we are any exception to this sociological generalization.

However, many of us have a difficult time in feeling as if we have really gained admittance to our social community as we have defined it; and usually, for us, that community consists of a great preponderance of visually competent members. Naturally, this feeling within us is going to produce behavior patterns that are found in all so-called minority groups; namely, fear and feelings of inadequacy, attitudes which are destructive to participation and identification. They are destructive for two reasons: first, because they repel rather than attract the advances of others; and second, because they blunt our sensitivity to others and impose artificial limitations on our choices and on our self-initiated relationships. Obviously, then, the attitude of the blind person toward the majority members will inevitably define to him in large part his concept of himself and of the community. This is the same problem that confronts the mixed-breed Indians, the Jews, and the victims of polio, a problem stated aptly by Shakespear when Cassius said,

The fault, dear Brutus, is not in our stars
But in ourselves, that we are underlings.

Naturally, it is always much more convenient to blame the environmental situation for our failure to achieve the social competence we covet, than it is to search out the causal factor and do something about it. It goes without saying that a great variety of objective situations and personal circumstances contributes to the final result which is we and our attitudes. I would like to talk about two of these which seem to me to be of the highest importance: first, geography; and second, the makeup of the immediate social surroundings. And I wish to discuss them as named, in reverse order of their importance.

With your forebearance, I will illustrate to you what I mean by geographical influence, by describing to you the situation as it existed in the Pacific northwest during the first decade-and-a-half of the century. Oregon, where I lived, was similar to Washington and Idaho, sparsely populated, spotted with towns and embryonic cities, spaced two or three days' journey apart on a good saddle horse. Portland, the largest city in the state, was not quite as big as Bakersfield. Salem, the capital, had a population of less than 5000. My home town had a population of 250. The state school for the blind which I attended for seven years had 46 students when I entered in 1905, and 52 when I left under duress in 1912. The home town high school which I attended had a student body of 31 and my graduating class consisted of 5 girls and me. So far as I was able to learn, the vast area of southern Oregon in which I lived contained only 1 other blind person of whom I heard occasionally, but whom I never saw. This territory comprised about twenty thousand square miles. But what chance there for propinquity? That the situation was relatively the same throughout the state is indicated by the fact that the thirty-odd counties of the state averaged about 1-1/2 students each at the school for the blind.

The point I want to make is that these individuals were prevented from having any social relations with each other or ego identification with any blindness because of the geographical distance barriers. This made it necessary for them to grow up as a part of their local sighted community if they were to have community identification at all. Naturally, there were those who projected themselves into the community actively and those who withdrew from all outside relationships aside from their own families. The path they took, whichever it was, defined for them their social environment and themselves.

It so happened that the tribe of Cutsforths were a friendly, sociable, frontier people. At the time I thought nothing about it. It seemed perfectly natural and normal that I knew and liked all the people within a forty-five mile radius of my home. This was

true not only of me, but of most of my fellow students during my seven years at the Oregon school. Therefore, even if we liked and enjoyed each other for the most part at school, no concept of "weness" or "we, the blind," developed. That limited environment was too meager for us. The friendly town, surrounded by small farms, along with what modern education might consider an under-organized and overrelaxed attitude toward free time activities, allowed us to pursue the kind of relationships we had learned at home. It is quite evident why, on graduation, no one even thought of an alumni association.

I believe that this geographical situation functioned to prevent the social concept of "we, the blind," from developing in the Pacific northwest, and I am convinced that it was a large factor in causing the individual success of Robert B. Irwin, George F. Meyer, E.F. Irvine, and Newell Perry whose formative years were spent in a comparable period of sparse population in northern California. It is interesting to note that no dual marriage occurred in the state of Oregon prior to 1923, and when I left Oregon in 1936, there was no vestige of any sort of organization for the blind. It was not until I moved away from the north Pacific Coast that I first became aware of and heard about the so-called hostility and impenetrability of the sighted world.

This phenomenon, my common sense tells me, must have some basis in reality. Certainly, the hymn of hate that you hear sung in California is almost a national anthem of the blind, blaming the problems and woes of the blind upon the discriminating and rejecting sighted public. Frankly, I am rationally capable of perceiving this problem, but emotionally it has perhaps been my good fortune not to have experienced it. Again, it is quite possible that it was about that it was said:

> There was a young man so benighted
> He didn't know when he was slighted
> So he went to the party
> And ate just as hearty
> As though he had been invited.

If I happen to be so opaque and socially nonperceptive, the only excuse I can offer for myself is that nine-tenths of my life has been spent living with, going to school with, and working with sighted people. So perhaps it will not appear too farfetched if I identify this persecuted attitude that we are laboring under and with, as the "Chinese Wall" of the blind. The Chinese found that the wall they had built served better to contain themselves then to keep out the invading Manchurians and Mongolians. Likewise, our wall, constructed of fear of the sighted public and of our own feelings of inadequacy in dealing with them, we find it extremely difficult if not impossible to scale ourselves and thereby approach whatever lies without; while we still feel vulnerable to attack

from every side.

Now let us return to the second of those objective situations affecting personality growth, which were stated at the beginning of this talk, that is, the makeup of the immediate social surroundings. In this relation, let me cite a clear-cut example of how propinquity can cause a minority group to fail to become a part of the community.

In 1915, the University of Oregon had but one student from the Philippine Islands. He lived in the home of a professor of geology where he earned his living as the houseboy and baby sitter. Since no one on the campus spoke or understood any of the native dialects current on Luzon or Mindanao, he found it necessary to converse in English and he soon became quite fluent. He made friends with many of the students, became a good tennis player, and did well in the American game of basketball, all this in addition to a very creditable performance in the classroom. By his junior year, all over the campus, Ben was Ben, an individual, and no longer the "little Filipino."

In 1923, the situation was very different. At that time there were about 20 Philippine students on the campus. Instead of following Ben's example, these students lived together and boarded themselves sticking as closely as possible to their native diet. They did not participate in any of the student activities on the campus. In their leisure time they congregated in the little used recreation room of the YMCA where they constantly played pingpong among themselves. Although these students had a good basic knowledge of English gained in their secondary training in the Islands, instead of using it in their own social conversations, they amalgamated it with their different local dialects into a wierd form of Pigeon English. Consequently, their speech deteriorated, hampering their classroom participation as well as all their communication outside their own group. Since they had been star students in their secondary schools, they developed a strong feeling of inadequacy which displayed itself in a paranoid form of suspicion and anxiety that they were being discriminated against. In the summer vacation, instead of dispersing and finding separate jobs, they contracted en masse, to work in some salmon cannery and spent the three summer months in an Alaskan barracks, repeating the same process of exclusive segregation.

This example I cite to illustrate the fact that it can happen to other people besides the blind who are segregated by society or voluntarily by their own choice, when circumstances, or the press of population bring sufficient numbers together. We lose contact with the community in which we live, we become incapable of forming an integral part separately and individually in that community, and we develop almost a paranoid attitude toward the community of fear and hatred, suspicion and greatly enhanced feelings of rejec-

tion and inadequacy.

The cause of this social phenomenon is about as simple as it is inevitable. It is far more comfortable and easy to get our own social and ego satisfaction in a homogeneous group, than it is in a diversified, heterogeneous social community. I do not believe we should linger in a further discussion of this unhappy social phenomenon. The important thing is to find out how we can overcome and correct in ourselves this, the greatest handicap of the blind. Discussion and understanding, however essential in defining a situation and pointing a direction rarely solve problems. It requires action to solve any problem whether that problem resides in a malfunctioning sink drain or in our social relationships.

We are all familiar with the organization of fez-capped, baggy-pantsed Shriners, organized to form a mutual group of kindred spirits for the sole purpose of having fun. This pattern the Shriners followed for several years until they found themselves the victim of their own exclusiveness which they themselves had produced. In order to justify their existence socially and bring themselves back into a satisfying relationship to the community as a whole, they adopted and have continued to support generously a program for the benefit of crippled children. It has always seemed to me that we have followed this pattern in our highly exclusive organization, no matter how small or how large, that instead of going into the community to socially justify our existence and show our beneficence, we have adopted ourselves as our major project, thereby compounding our isolation and separation from the community.

Now, I do not minimize what the organized blind have accomplished and are accomplishing. What I think we should consider are these two questions. First, are we inadvertently accomplishing something that we do not want to accomplish? Second, are we failing to extend our activities in directions that would be satisfying to us and that would, at the same time, increase our identification and promote our status in the community?

I was startled and intrigued by the leaflet recently put out by this organization. I heartily agree with the text of the leaflet and am proud to see that this organization is going to do whatever it can to lead the blind out of a position of a "gimme" minority into a position of respect and security in the community, as stated in the objectives of the organization. However, I feel that a stranger to the organization, having read the slogan and looked at the illustration heading the page, will be ill prepared to absorb the significance of the statement of objectives which follows. The slogan states, "The blind and sighted unite to push open doors of opportunity for the 28,000 blind persons in California." The illustration accompanying the

slogan shows an attractive blind girl opening the door of opportunity to the left, and a visual Joe Blow opening the door on the right. Within the girl's reach, in order, are a diploma, money, and a pleasant house. What appalled me is - what is there for good old Joe who opened the right-hand door? Not a dammed thing. Now couldn't there have been in that symbolic picture another blind girl offering JB at least a cigarett or a Pepsicola? Good old Joe can only assume that he is dismissed from the group activity until he is needed next time. Apparently, we fear the Greeks even when bearing gifts.

This is the image we have spent years in creating. This is the image we must change if we expect the community to believe in the objectives we state. This image can be changed only by action - action of individuals and action of the group. In this connection, I wish to remind you of something a knuckle-headed individual named Cutsforth wrote about a decade ago to the effect that we are in the position of being not the happy giver but the guilty receiver.

My father-in-law, an old Hoosier steeped in the lore and wisdom of the McGuffey Readers, used to say, "If a man would have friends, he must show himself friendly." We are want to feel hurt and resentful at the expressed or unexpressed feeling of many seeing people that our blindness is the most interesting thing about us. But perhaps we inadvertently foster this feeling. Let us ask ourselves these questions.

Do we expend as much concern, time, energy, and money in pursuit of the interests we have in common with our neighbors and seeing friends in the community in which we dwell, as we do in our peculiar interests as blind people?

We are noted for our political activities in behalf of ourselves as blind people. Do we, as individuals, enter as freely and wholeheartedly into political activities toward the goal of better government for all of us?

As professional people, as workers in industry, what relative proportion of ourselves do we give to our professional and trade organizations and how much do we participate in the social life of these groups?

How much do we turn to our exclusive groups for outlets that we could and should be finding among people of like talents and like interests in the community at large?

Nobody is going to drag us, kicking and screaming, over our Chinese wall. But if we approach it with a realistic evaluation of ourselves as human beings, we may find that it is unsubstantial, and that we have walked right through it.

I hope to live to see the day when some state organization of the blind, and I hope it will be this one, will initiate and support a completely nonblind project, for the benefit not of blind people, but of people, as our peers. Let me ask you, what would be the change in attitude of the sighted public towards us if this association were to come out with such an undertaking as sponsoring a scholarship in engineering or political science for an able student from one of the new African nations? And what would be the change in our attitude towards ourselves as we turned our interest and energies outward and abandoned the role of the begger who solicits aid for himself?

When we are able to function collectively and individually in behalf of our community as a whole, then we can proudly say that we are truly part of the community.

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